

# COAL AGE

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No. 6

*"Still have I borne it with a patient shrug  
For sufferance is the badge of all our tribe."*

Mr. Mine owner, sit down for a few moments and recall the fake damage suits that have been hatched around your diggings by shyster lawyers during the past year, and then read the above quotation by Shakespeare. Are you proud of "our tribe?"

Nearly every state in the union has a bar association and each of these state organizations meets yearly and assures the public at large that they will not countenance *champerty* in their ranks.

After these solemn declarations, *champerty* ought to cease, but it doesn't. Possibly the rank and file of the legal profession assume that the layman doesn't understand what *champerty* means and so decide that they may practice it with impunity around all of the coal-mining camps that come under their observation.

Here is a part of the definition of *champerty*, given by the Century Dictionary: "The purchase of a suit or the right of suing. Champerty is a punishable offense by common law, and in some jurisdictions, by statute." If we ever get educated to a point where *champerty* is in every man's vocabulary, the word shyster will only survive in dictionaries.

Year by year the cost of liability insurance to coal-mining companies has risen, until it now has reached a point, in some states, where it is all but prohibitive to a small operator; and even at that, the liability companies are not declaring dividends. Still it appears the worst is yet to come.

Some operators are beginning to wake up to the fact that it is time to help the public to understand that these drains saddled upon the coal-mining industry must eventually raise the price of coal to the consumer.

A majority of the coal operators are merely practicing the sufferance act. However, a few colliery owners are taking steps to place scare-crows around their plants, for the especial benefit of the shysters.

We know of one manager who employs a detective occasionally, to follow the shysters and their agents, when they become active around his camp. It may surprise you to know that these human blots on the legal profession have decided that it doesn't pay to buy the accident claims that originate at that mine.

*Most any farmer can improvise a scare-crow. Try it.*

## Ideas and Suggestions

### Efficiency When Approaching a Limit

BY W. VA. SUPERINTENDENT

In resultants varying as the forces, we are apt to neglect certain factors which become operative when a limit is being approached. We say, "With a lever long enough and a fulcrum strong enough, we could move mountains; with pressure and cold sufficient, all matter might be solidified; with a telescope of high enough power, we could study the inhabitants of our neighboring planets; and separating the molecule is only a matter of sufficient microscopic power." Yet, in spite of a certain advance toward these ends, difficulties have always appeared which were not encountered when working farther from the limit.

What seems a much simpler problem is the calculation of the equipment and the number of miners to produce a given tonnage. We consult our records and find that the average miner for a given seam of coal, with given equipment, is capable of producing six, seven or eight tons per day. We then multiply the number and increase the equipment and expect to get a proportionate increase in tonnage. That is, with 100 men you have been able to produce 800 tons per day. If 100 men in one day produce 800 tons, how many tons per day will 200 men produce? That sounds just like the mental arithmetic of the lower grades, and we have but to shut our eyes in order to see the dozens of small hands flying up, eager to give the answer—1600 tons, and that answer calls for 100 per cent.

#### AN INCREASE IN THE NUMBER OF MINERS DOES NOT BRING A CORRESPONDING INCREASE IN TONNAGE

But, in actual practice, if 1600 tons is approaching the calculated capacity of the mine, we find that an increase from 100 to 150 miners makes the efficiency of the miner drop to something below eight tons, and as the number rises toward 200, the number of cars per man takes another drop, so that when you have your 200 miners, they are producing considerably less than the 1600 tons, or an increase of 50 per cent. in miners has increased the output perhaps 25 per cent. Of course, you are getting a nice tonnage, but it is falling short of the calculation. At this point men begin quitting, partly because their earning capacity is not what it was when there were fewer men.

If the fall in efficiency were an average drop, affecting all miners alike, perhaps the effect of working near capacity would not cause any considerable dissatisfaction, but it is more probable that the last comers have suffered most. The old men have a way of looking out for themselves and taking advantage of car service and the cutting of their places, so the men most affected, finding that they can work to better advantage in a mine that is not so crowded, leave with more or less disgust, take some of the others with them, and pronounce the plant "no good."

Another possible factor to be counted on in approaching a limit of capacity is the chance that the last men hired may be "floaters." Every mine has its nucleus of old miners who stay while others come and go, and it is these men who are getting the tonnage when the mine is operating at less than capacity. Perhaps, too, they may realize that an increase in men may lessen their chance for service and, in a quiet way, discourage others who come around looking for work.

#### THE CAPACITY OF OFFICIALS FOR SERVICE IS NOT SO FLEXIBLE AS MANY PEOPLE BELIEVE

We are too sure that results will come in arithmetical proportion, that is, double the men, double the tonnage. We are apt to forget the factors that show up when approaching a limit. Perhaps we are too quick to take it for granted that the man who can handle 100 men can keep 200 up to efficiency, or that the boss looking after 25 can attend to 50 just as well. In the calculation of equipment, the mine has been provided with a superintendent, mine foreman and assistants. Their capacity for service is supposed to be flexible enough to meet the demands of the mine up to the point of capacity; but, nevertheless, when their routine of daily duties has been established on a basis of only partial capacity, when the struggle comes of maintaining a maximum, it requires ability and real devotion to duty to rise to the increasing demands on time and attention.

A certain car equipment has been calculated as adequate for the limit of capacity, but when they have been distributed in a certain way for 100 men, it requires some adjustment to make a satisfactory distribution for an increasing number of men. The machines should be able to cut for 200 men, but the habits of the runner must change as he approaches capacity. A breakdown may have little effect when there is a chance to shift in other machinery, but at full capacity every delay is felt immediately by someone. Working machinery to its limit multiplies the liability to breakdown, and an injury to it while operating at its full capacity is apt to be more serious than when it is running with reserve power. And so we might go on showing why so few of our mines ever reach that capacity for which they were planned.

We are all familiar with the old preachment that success and achievement are measured by the small margins over and above what is fairly good, and that the world's record makers are champions by reason of their fractions of seconds, inches and ounces. The highest was accomplished by efficiency as it approached a limit, and the struggle to make those fractions stands out as the real point of excellence.

Applied to tonnage getting, the real struggle also begins when the mine is approaching its maximum. At a good mine with good, new equipment, favorable surroundings, and a fair organization of foremen, almost any man ought to get tolerable results from a partial complement of miners, but the man who is working at capacity and holding his men is about as rare as cham-

pionship material, or as that long lever with fulcrum "strong enough." Solving the problem is at best like extracting the square root of an imperfect square to the "n-th" decimal place.

## A Plea for More Frequent Inspection of Mines

BY A MINER\*

In view of the fact that hundreds of men lose their lives annually in the mines, by falls of coal or rock, and considering that we have splendid mine laws that are intended to safeguard the miner and protect the property of the mine owner, it seems to me that the factors most responsible for fatal mine accidents due to falls of roof or coal, are the carelessness or ignorance of the miner and the lack of sufficient official inspection of the working places.

In many mines, where the working places are scattered over a large area, neither the mine foreman nor his assistant is able to reach some of these places, until several hours after the men commence work. Most of the serious accidents that have come under my observation could have been avoided by closer inspection, or, I would say, a more frequent inspection by the foreman or his assistant.

Suppose, for a moment, there are 20 or 25 men working on a heading; if an assistant boss had charge of not more than two headings, he could give the work better attention, advise, or better still, supervise the setting of timber; and, at the same time, increase the output of coal from his entries, by looking after the loading of the coal and seeing that the driver is not delayed by cars not being ready. In many cases, the rule has worked well, that a man loses his "turn" if his coal is not loaded and ready for the driver when he calls.

The extra cost of such closer inspection would, in most cases, be offset by the increased output of the mines, to say nothing of the reduction in the number of fatal accidents and the delays incident thereto. By giving his entire time to the men under his charge, each assistant boss becomes more familiar with the habits of his men and is better able to expedite the work in many ways.

## Safety First on the Man-Trip

BY RALPH W. MAYER†

A half-inch cable carried around the man-trip of cars, and having each end fastened to the main haulage rope, serves to minimize the dangers of the trip breaking in two and the men being dashed to pieces at the bottom of the slope.

When ready to put the cable in place, it is carried, tied in a neat coil, to the back end of the trip of cars. Two men each take an end of the cable and walk toward the forward end of the trip, one of them on each side of the cars. Hooks are fastened on the ends of the cable, and these are hooked into the short length of chain on the end of the main haulage rope.

A half-inch cable, one end on each side of the cars, is strong enough to hold a broken trip, and light enough

to be handled easily. The last couple of cars should be pushed together, so that their couplings are slack when the cable is put in place. This makes the cable taut, while at the same time all the pull is upon the car couplings. If the couplings should break, there would be very little or no slack between the end of the last car and the cable.

The cable is held in position by hooks made from one-fourth inch round iron. These are made about 14 in. long and have a hook on each end, both being bent toward the car to avoid catching anything when the cars are in motion. One end of the hook is hung over the top of the side of the car, and the cable hung on the other end of the hook.

If the cars have boxes or bodies overhanging the wheels, the hooks should be made long enough so that the lower end reaches below the overhanging part of the box, as it is then more out of the way. Two hooks for each car, one on each side, are sufficient.

When the men are all hoisted or lowered, the cable is taken off and neatly tied in a coil. The hooks are hung over the top of a nail keg—on the inside of the keg—and everything is in order when required for use again.

Allowing no person to get on or off the man-trip after it has started, or before it has stopped, helps to decrease the danger of accident. Disciplining anyone who disobeys this regulation by compelling him to take a day's layoff from work will soon cause it to be respected.

## Superfluous Legislation

A report from West Virginia calls attention to the fact that during 1913 more than fifty bills prejudicial to the coal companies were introduced in the legislature of that state. Not all of these measures were passed, but a sufficient number became law to greatly hamper the progress of the mining industry in that particular field.

Reform legislation is now the chief bugaboo of the coal-mining men. Practically every new law that is passed means an added expense to the cost of operation. Some remedial legislation here and there has been called for; but there has been no necessity for our lawmakers running amuck. The need of the hour is the strict enforcement of present laws rather than the enactment of new ones.

## BY THE WAY

A disease known is half cured.

The meteor fallen to the earth is but a stone.

Let's hope the "rule of reason" is applied in Ohio.

Do not give your measure to anyone but your tailor.

True merit is like a river; the deeper it is the less noise it makes.

A man often admits that his memory is at fault, but never his judgment.

The miners are so busily engaged in determining the "booze fighting" propensities of Sam Gompers that they may not get around to asking for the customary advance. Who should worry?

\*Bollivar, Penn.

†Roslyn, Washington.



# Purchased Power and Bituminous Coal Mining

By A. E. RICKARDS\*

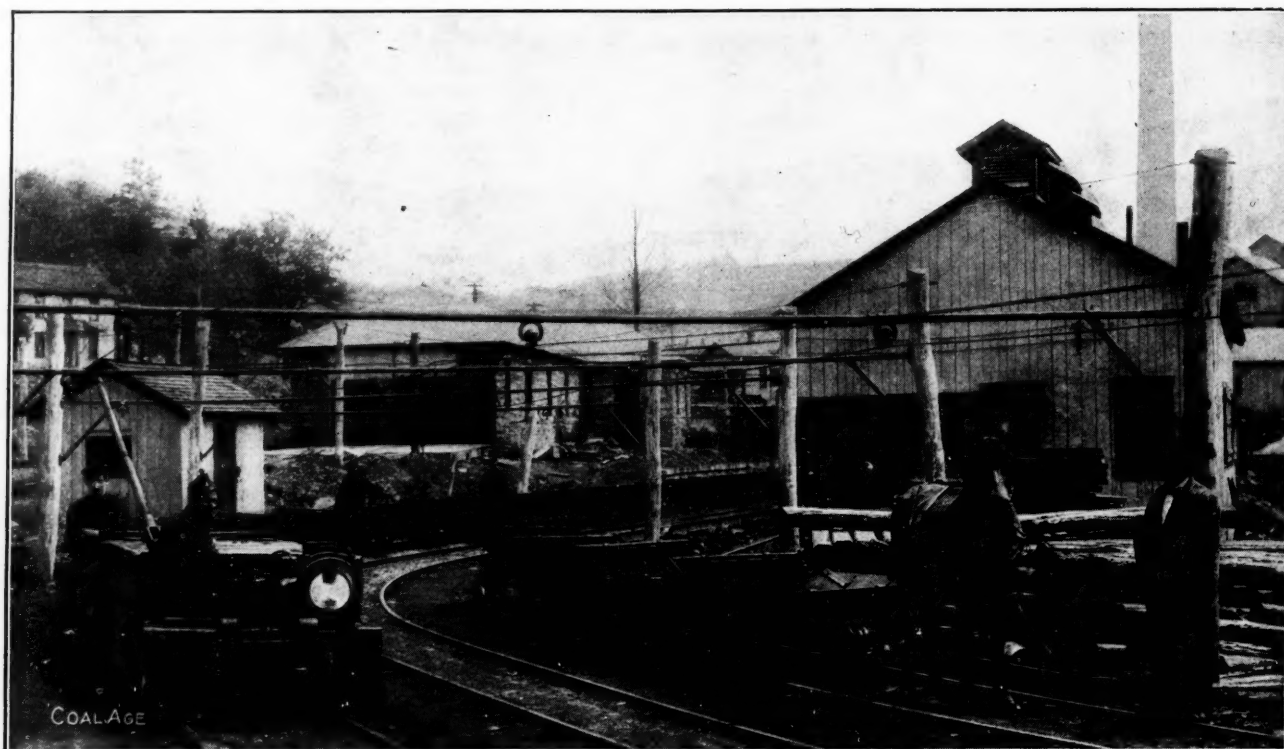
*SYNOPSIS—There has been during the past five years a vast increase in the amount of central station power purchased by coal producers. The principal uses and advantages of this source of power to the operator are here discussed.*

Can a bituminous coal operator purchase electricity cheaper than he can generate it himself? Many coal producers now have this question before them. It has

The situation before the average coal producer is such that purchased power supplies a means to assist in solving some of his most difficult problems. These are:

1. How to increase the production.
2. How to reduce the cost of mining.
3. How to keep the increase in the investment consistent with the increase in the production.

Many operators know that electricity applied to their workings would increase the output. It is, however, ex-



THE NEW AND THE OLD METHOD OF MINE HAULAGE

been created through the activities of the power companies in their endeavor to sell their product in the coal fields.

The total amount of current now purchased by the bituminous operators from central stations is estimated to exceed 100,000 hp. The income from this market to the power companies is approximately \$3,250,000 per year. When one considers that the greater part of this business was obtained during the past five years, it shows a remarkable growth—there must be a reason for this expansion.

Purchased power offers so many advantages to the majority of the bituminous coal operators that it will only be a question of time when many, possibly most of them, will use it. However, before this is brought about, more must be known of its merits. Today, most of the operators know as little about what central station service affords as the power companies know about coal mining.

pensive to install a generating plant and equip a mine for electrical operation.

An operation now using steam power and mule haulage can change to electric power at a minimum of expense if the current is purchased from a power company. By so doing, the greatest item of expense (the power plant) is eliminated. In this manner the tonnage can be raised with but a small increase in the capital account.

More power is required per ton of coal mined as the underground workings are extended. With an isolated plant, this increase in the demand for power frequently requires expensive alterations and additions to the generating equipment. When central station service is used additional power can be had and usually the only expense is for a new motor or motor-generator set.

The cost of power in a coal mine is an important item. A reduction in this expense means much towards lessening the cost of production. In most cases an operator can purchase electricity cheaper than he can produce it himself.

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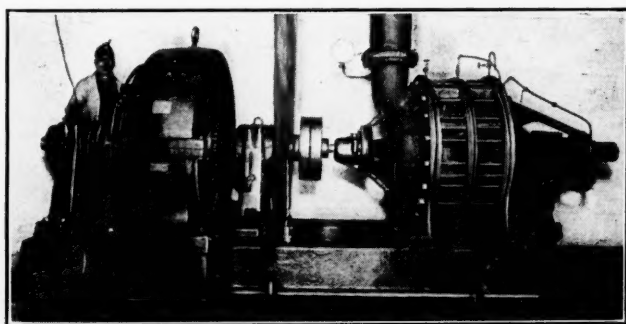
## THE PRESENT SITUATION

The general situation confronting the coal producers is such that in the future many of them must take advantage of purchased power. It is the one means of meeting the conditions.

Today the power required by the average mine is three times greater than the amount necessary 10 years ago. Such an increase to isolated power plants is exceedingly expensive. In the same period of time the capital necessary has increased three fold.

During the past decade the demand for coal has doubled. If the present rate of increase continues, the quantity mined this decade will be twice that mined in the one just past.

With the rapid increase in the demand for coal, the cost to produce it has become greater. If central station power will be a means to increase the tonnage, reduce production costs, and allow extensions to be made at a minimum of expense, surely the operators will want



A MOTOR-DRIVEN CENTRIFUGAL PUMP

it. The idea of an isolated plant is, however, so firmly rooted in the average operator's mind, that he must first be taught the possibilities of purchased power.

Now comes the question of how purchased power may be advantageously applied. It may be employed to operate pumps, fans, hoists, haulage and gathering locomotives, gathering reels, coal-cutting machines and punchers.

A general plan cannot be laid down that would apply to the electrification of all mines. Each operation presents a problem in itself and must be treated as necessary to cover its own peculiar conditions. However, the following is a general outline of applications most commonly used.

Small pumps are usually driven by 250- or 550-volt, direct-current motors. The power supply is taken from the nearest trolley or cutting line. Large pumps, in many cases, are operated only at night and are driven by 2300-volt, alternating-current motors.

Fans operate continuously and are often driven by 2300-volt, alternating-current motors. The principal advantage of this application for large pumps and fans is because it allows the use of a smaller motor-generator set, the losses incurred in converting alternating to direct current being thus lessened. Furthermore, the cost of installation is less.

The haulage and gathering locomotives, gathering reels, coal-cutting machines and punchers are driven by either 250- or 550-volt, direct-current motors.

Before describing the different kinds of machines, it would be interesting to note the methods used years ago.

## FORMER METHODS OF MINING

The methods used in the early days to mine coal were indeed primitive. The operation generally consisted of digging a hole in the side of a hill at the outcrop. The coal was undermined with a pick, forced down with wedges, and then loaded into small cars running upon wooden rails. After the cars were loaded, they were pushed out to the surface by hand.

As the distance from the surface became greater, the work of pushing the cars in and out became quite burdensome and the mule was initiated into the mysterious underground haulage. This faithful animal has become so firmly rooted in this occupation that it will be some time before he has become completely supplanted by more economical methods of underground transportation.

The first power required in the early operations was for the pumps. Unless the entries could be so driven that



MINE FAN ALTERED FROM STEAM TO ELECTRIC DRIVE

the mine was self-draining, more or less water would accumulate in the workings, which had to be pumped out to keep the mine in operation.

This was at first and is still, largely accomplished by steam pumps, mostly of the reciprocating type. The steam is generated in a boiler plant, located near the pit mouth and carried underground to the pumps. These steam lines are frequently of considerable length. In the hard-coal region it is a common experience to see a steam line carried over the surface of the ground for several thousand feet from the boiler plant and then conducted down a bore hole several hundred feet deep to a pump in a mine. Only poor economy can be obtained under such conditions due to the large amount of condensation, drop in steam pressure and leaks.

The reciprocating type of pump taking steam full stroke is also inherently uneconomical. Tests upon these machines often show that they consume 120 to 130 lb. of steam per horsepower hour.

Compressed air is also used to a large extent in operating pumps. The disadvantage of this system is that it requires considerable compressor capacity; also it is not as economical as the steam pump, although it has the advantage of no condensation.

In the better class of mines, the steam and air pumps are being replaced by electric-driven pumps, thus effecting a considerable saving in upkeep and in the power consumption. The losses in electric systems are comparatively low; while the maintenance can be kept low with but little attention.

For small pumps up to 25-hp., direct-current motors

geared to duplex or triplex machines, are generally used, because the power for driving is usually taken from the haulage or the cutting lines. These motors are often arranged for self-starting and require little attention. The larger pumps are generally of the centrifugal type and it is the common practice to drive them with alternating-current motors.

The practice in some of the large mines is to operate several small reciprocating pumps throughout the mine during the day, pumping into a common sump, which is emptied at night by one or more large centrifugal pumps. This arrangement improves the load factor to a considerable extent.

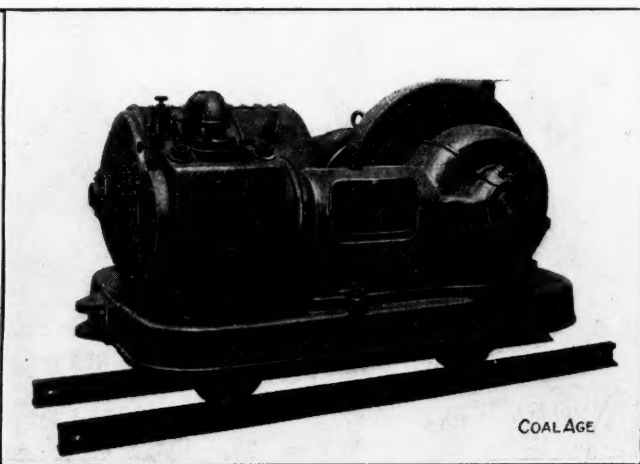
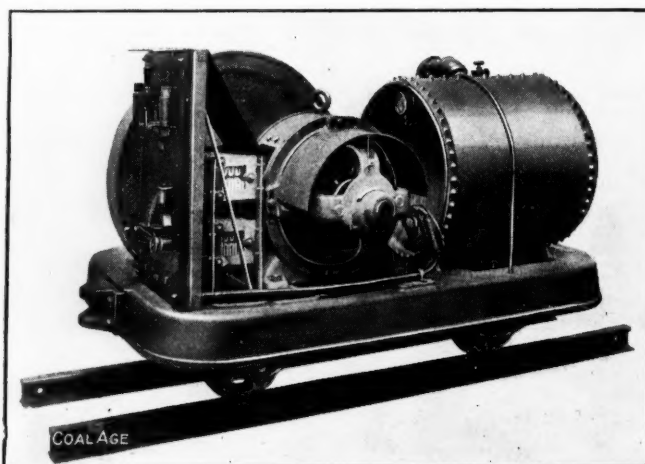
#### VENTILATING SYSTEMS

The next department about the mine to require power is the ventilating system. In the early days the operators depended entirely upon the natural draft or fur-

during the day and at one-half speed during the night, on Sundays and holidays. In this way considerable power can be saved. The methods to be used depend upon the locality.

When direct-current motors are used for this work they are usually of the shunt type. By using commutating poles a considerable variation in speed can be obtained by field control with high economy.

The squirrel-cage type of a.c. motor is best adapted for driving fans at constant speed. When two speeds are desired, a double-winding squirrel-cage motor is used. If a variation in speed is required, a wound secondary motor must be employed with resistance inserted in the secondary circuit to reduce the speed. With this application the economy at slow speed is, of course, low, but as the power to drive a fan varies approximately as the cube of the speed, the actual power lost is not large at greatly reduced speeds.



TWO VIEWS OF A PORTABLE MOTOR-DRIVEN AIR COMPRESSOR

naces. A forced or induced draft, produced by a power-driven fan, has become the most reliable method of ventilation. A large percentage of these fans are driven by steam engines. However, the steam lines are often long and frequently uncovered, so that the heat losses are high.

Owing to the importance of the fan operation any new method of drive must prove itself reliable before a mine operator will consent to use it. The electric motor has proven itself thoroughly dependable when applied to a mine fan. It has many advantages over the steam engine as it requires less attention, less repairs, consumes less power and the continuity of operation is more assured.

In applying an electric motor to a mine fan, it is seldom possible to use a direct connection, owing to the inherent low speed of the fan. Belting, gears and chain drives are the methods generally used. Belting is the most satisfactory when the reduction is not too great.

Both alternating- and direct-current motors are used to drive the fans, the advantages being with an a.c. motor when purchasing electricity, as no conversion of power is necessary. Furthermore, with this arrangement, the direct-current power equipment can be shut down during a portion of the 24 hours.

In some mines the fans are operated at the same speed, 24 hours per day, while in others, they are run full speed

There are a number of schemes being tried out in Europe by which variable speeds can be obtained at fairly high efficiencies. This is accomplished by using a wound-rotor, alternating-current motor in combination with two or three auxiliary machines and a rather complicated control system. While these systems are meeting with a fair degree of success in Europe, where high-class labor is easily obtainable, it is rather doubtful just what results would be obtained here where skilled labor is difficult to secure in the mining field.

The motor and control for a mine fan should be as simple and reliable as possible. A properly installed motor-driven fan will operate over long periods of time with practically no attention outside an occasional inspection. Recently, many fans, formerly driven by steam engines, have been changed to motor application.

#### MEANS AND METHODS OF HAULAGE

When a mine became developed and the length of the haul increased, it soon became evident that some mechanical method must supersede animal haulage. As the length of the haul becomes greater the expense increases rapidly. Rope haulage was first tried, the rope being driven by a steam engine. There are many conditions today where this means proves the best system of haulage.

For the majority of conditions, however, the electric

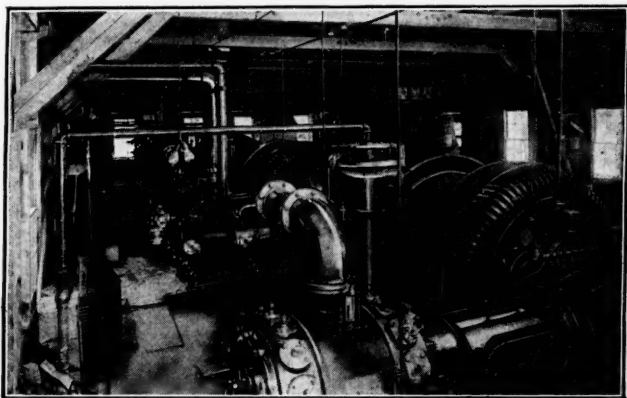
locomotive has proven the most economical and efficient method for both haulage and gathering. Our old friend the mule has been driven from the main gangway for some time and is now making his last stand in gathering.

The life of a mule underground will not average over four years. The cost for feed, harness, veterinary services and stabling will run about 50c. per day. Adding the wages of drivers to this it is not a difficult matter to show a considerable saving by the use of locomotives.

In extremely gaseous mines, compressed-air locomotives are used to advantage. This type of machine should be employed only when it is impossible to use the trolley type. Its cost of operation and upkeep is comparatively high.

The storage-battery locomotive, when properly constructed and equipped, will probably be the solution for the gaseous mine. At present its high first cost is a little discouraging.

As the mine haulage is in many respects similar to a railway system, the electric locomotive is equipped with



A MOTOR-DRIVEN COMPRESSOR PLANT

the same type of motor and control. In this country, direct current at 250 or 550 volts is the universal practice.

The motors are series wound and in the later types they are equipped with commutating poles which greatly increase the reliability of the machine. This feature, to a large degree, also cuts down the motor repairs and consequent delays.

The controller is of the drum type arranged for series and parallel operation.

Most locomotives are equipped with two motors, although three are sometimes used on large sizes. Where a heavier locomotive is required than the rails can carry, two machines are coupled together and operated in tandem from one controller.

Gasoline locomotives are being tried out for mine haulage, but so far have met with indifferent success.

For gathering service two types of reels are used for drawing the cars from the rooms to which the trolley wires have not been extended. The cable-reel attachment consists of a single or double conductor cable, wound upon a small drum and so arranged that a tension is kept on the cable at all times. This conductor supplies power to the locomotive and unwinds and winds up as the machine moves in or out of a room.

The traction-reel or crab, consists of a small motor-driven winch mounted on one side of the locomotive and is employed to haul cars out of rooms where it is not

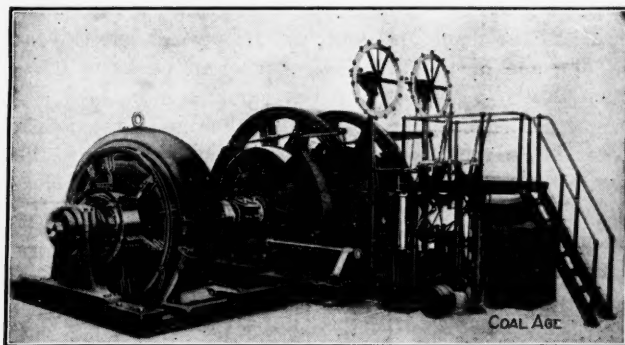
convenient to use an electric cable reel. This type of machine is best suited to mines where the rooms are worked to the dip and the grades are too severe for locomotive haulage.

For gathering, service locomotives ranging from 3½ to 8 tons are used, while for main haulage, the weights run from 6 to 20 tons, or even higher.

#### ROPE HAULAGE AND HOISTS

The rope-haulage systems, previously spoken of, are used on grades ranging from 0 to 90°. In practically all cases these were first operated by steam, although quite a number of gravity systems are in use. Where power is purchased or the hoisting outfit is located some distance from the steam plant, an electric motor may be substituted to advantage. A large number of steam haulage systems and hoists have recently been changed to electric drive. For small hoists and haulages, both alternating- and direct-current motors are used, depending on local conditions and the kind of power available.

For large haulage units or hoists of slow or medium speed, the alternating-current, polyphase, wound-rotor



A MOTOR-DRIVEN REEL MINE HOIST

motor is used with a liquid or magnetic controller. For large high-speed hoists, a separately excited direct-current motor is used taking power from a special motor-generator set and operating upon either the Ward-Leonard or the Illgner systems.

#### THE ACTUAL PROCESS OF MINING

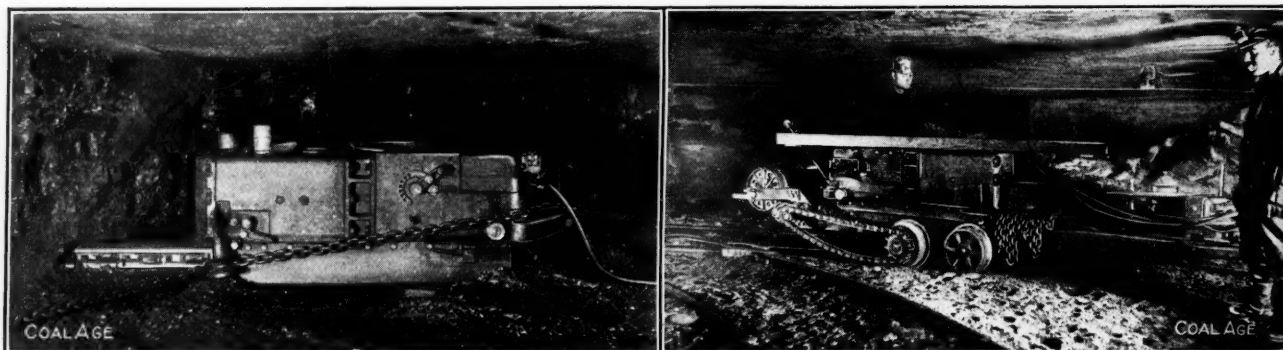
The actual operation of mining consists in undercutting the coal at the floor and then shooting it down with light charges of powder placed in holes drilled between the under-cut and the roof.

As previously stated, in the early days before the use of powder became the practice, the coal was wedged down. This was a slow and very tedious process. The undermining was first accomplished by hand with the ordinary mine pick. In fact today a large part of the coal is obtained by pick mining.

Among the simplest mechanical means for undercutting the coal is the compressed-air puncher. It consists of a reciprocating chisel or pick, driven by air. The operator directs the blows of the puncher against the coal and an assistant shovels back the fine material produced, so as to leave a clear opening. This under-cut is about 16 in. high in front and 4 in. high at the rear and is from 4 to 5 ft. in depth. This wedge-shaped cut greatly assists in bringing the coal down with light powder charges without breaking it up too fine.

The compressor plant to furnish air for these machines,





A CHAIN COAL CUTTER AT WORK AND BEING MOVED

is usually located outside the mine near the boiler house. Electric-driven compressors may, however, be operated very successfully with purchased power. They furnish a steady load for synchronous motors, which in turn can be used for power-factor correction. Whenever possible, electric drive should be used because of the inefficiency of the compressed-air system.

Portable compressor plants are sometimes used to help out the main plant and keep up the pressure at the far end of some of the pipelines. Such an outfit is illustrated in the accompanying photographs.

A combined electric and air puncher is in use which gives the advantage of electric transmission and the puncher under-cut. This really can be classed as an electric cutter giving a wedge-shaped under-cut which is not obtained with a chain machine.

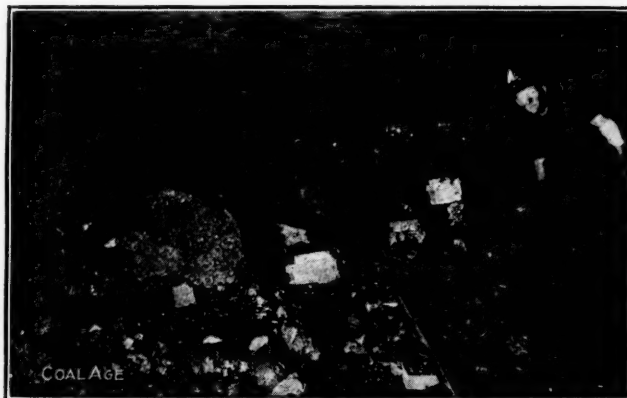
A number of straight electric-mining machines are on the market and consist of a moving chain upon which is mounted a series of small picks or chisels. These machines make an under-cut of uniform thickness from 4 to 6 in. in height and 6 to 6½ ft. deep.

The short-wall type of chain machine will cut into the face of the coal and then move across a 25-ft. room in about 10 minutes. An air puncher will require about 30 minutes to do the same work. It is largely due to machines of the former type that the immense coal pro-

duction of today is possible. The present labor supply would be far from adequate if all coal were mined by the hand-pick method.

One of the illustrations shows a chain machine making a cut across the face of a room. Another shows the same machine loaded on a truck ready to move to another place under its own power, while still another figure shows the results of blasting down the coal after having been undercut.

The chain cutting machines are generally equipped with a 30-hp. direct-current compound-wound motor of 250 or 550 volts. Recently some of these machines have



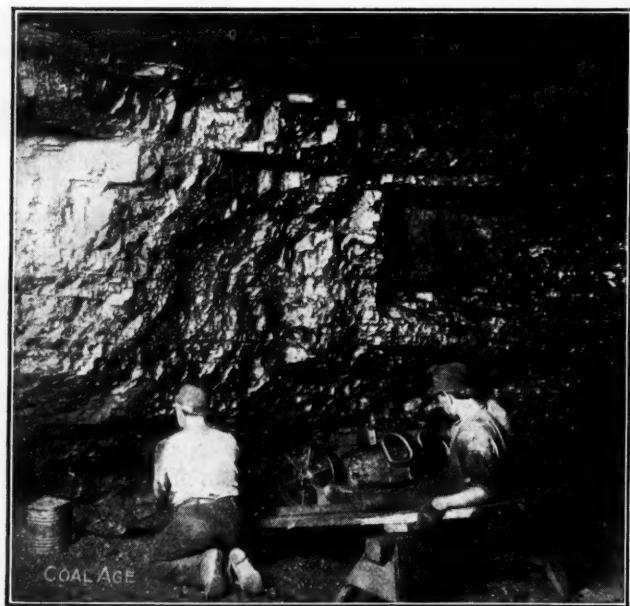
RESULT OF A SHOT AFTER UNDERCUTTING

been driven successfully by alternating-current, squirrel-cage motors.

#### DRIVING AUXILIARIES AND LIGHTING

There is often a considerable amount of power in use on the outside at a mine. This power consists principally of auxiliary hoists, chain haulages, crushers, shakers, elevators, washers, pumps, machine shops, etc. In many cases, these auxiliaries are driven by individual steam engines whose principal virtue is that they give fairly high continuity of operation. Most such applications can be easily taken care of in a much better and more economical way by substituting electric motors for the steam engines. In many cases, alternating-current motors can be applied, which greatly simplifies the power system.

In mines not using electric power, no attempt is made to light the workings. It has been found, however, that some illumination is necessary at switches, cross-overs, partings, pumps and underground fans. The incandescent electric lamp has proven the best and cheapest method of providing underground illumination.



UNDERCUTTING WITH AIR PUNCHER

## CONCLUSIONS

A great many mines do not use electricity at all. Of those who have changed over from steam to electricity, it has been their experience that a great saving has been effected and the output increased. Of course, after a mine has been changed over, the operating forces will require some time to adjust themselves to the new conditions.

The saving and increase in the output by the use of electric power make themselves most manifest when current is purchased from a central station. The "investment" and the "worry and care" of a substation are much less than that of an isolated plant. This is true to such an extent, that an operator once using purchased power will rarely, if ever, consider going back to his own power plant.

It is not an uncommon thing, when investigating the conditions, at a mine with an isolated plant, to find that

the power generated per ton of output, is as high as 12 to 14 kw.-hr., with a corresponding cost running from 15 to 25c. per ton. With the intelligent use of purchased power, the consumption should not average higher than 2 to 5 kw.-hr. per ton and the total cost for power should not run above 3 to 7c. per ton of output.

In changing over to central station power the greatest care should be exercised in selecting the proper power system and equipment. An improper selection may increase the costs instead of decreasing them.

The purchase of power is rapidly gaining ground, as is evident by the large number of mines now operated in this manner in Pennsylvania, Ohio, West Virginia, Illinois and Alabama.

The all-electric drive and purchased power are rapidly coming into favor. It will only be a few years when it will be the exception for a mine to operate from steam power generated at its own plant.

## Hydro-Electric Power for West Virginia Collieries

By C. A. TUPPER\*

*SYNOPSIS*—A description of the generating and distribution system of the Appalachian Power Co. furnishing electric energy to many mining operations in the Pocahontas and adjoining fields.

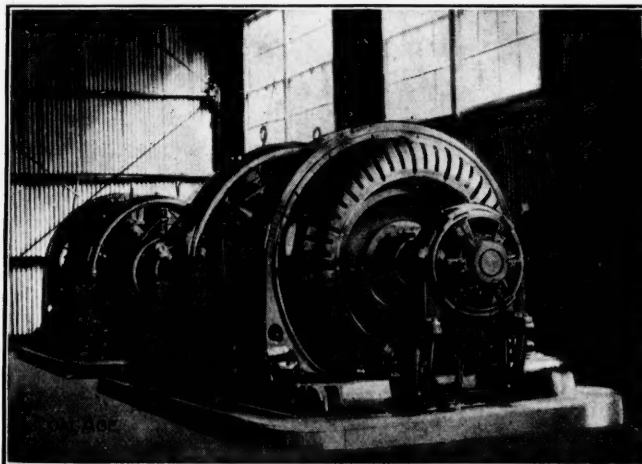
Projects for bringing hydro-electric power into the Pocahontas coal fields of West Virginia and those closely identified with them, such as the Tug River, Thacker, Kenova and Clinch Valley districts, have long been under consideration; but the initial expense of any undertaking of sufficient magnitude to accomplish the objects sought has, until recently, prevented the carrying out of such schemes.

During the past year, however, the first two of a series of large water-power developments, with the necessary generating, transmission and distributing systems, have

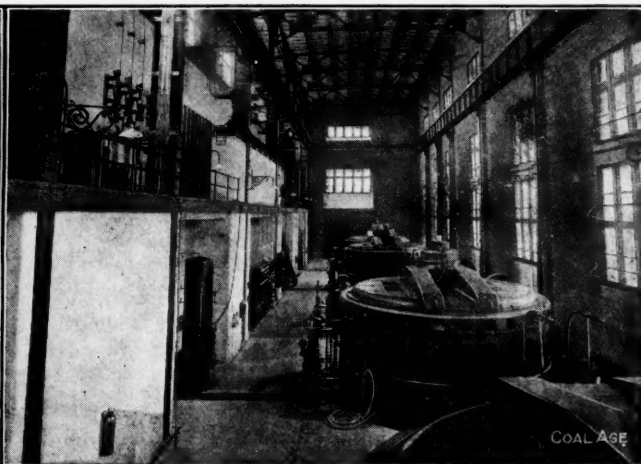
been carried to successful completion by the Appalachian Power Co., of Bluefield, W. Va., and upward of 40 separate coal-mining operations in the Pocahontas and adjacent fields are now being served with electric energy from this centralized system, which also includes steam reserve plants to insure an uninterrupted supply of power in any emergency.

In order to secure water power of sufficient capacity it was found necessary to go nearly 60 miles to the southeast into the state of Virginia, where surveys showed that the best opportunity for a large, constant supply of hydraulic energy was afforded by the New River. This stream, which rises in the Blue Ridge Mountains, flows in a general northerly or northwesterly direction to its confluence with the Ohio. In a distance of about 30 miles through Carroll and Pulaski Counties, Va., it has a fall of 225 ft., capable of being completely utilized in four or more power sites.

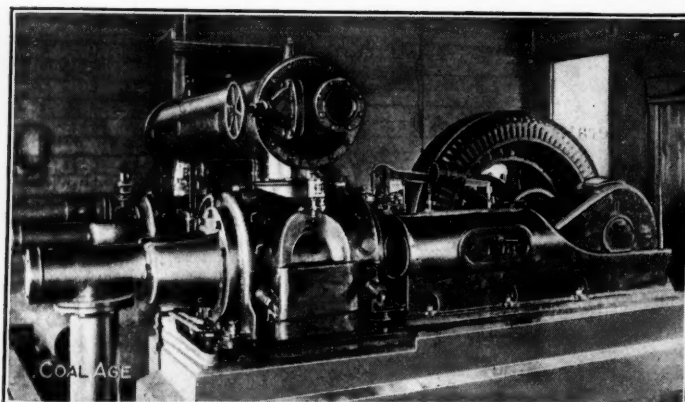
\*Insurance Exchange Bldg., Chicago, Ill.



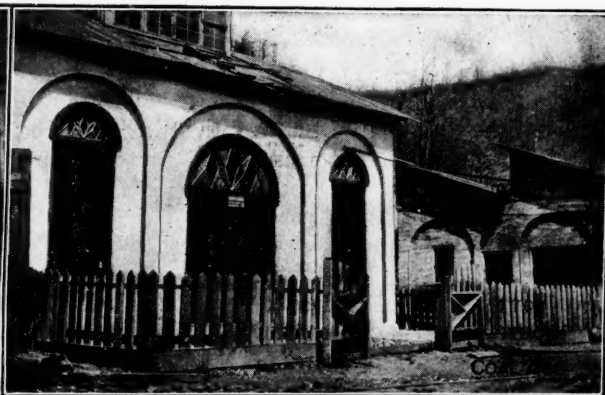
MOTOR-GENERATOR SETS FURNISHING DIRECT CURRENT FOR CUTTING, ETC.



INTERIOR OF HYDRO-ELECTRIC PLANT—20,000 HP. INSTALLED



A MOTOR-DRIVEN AIR COMPRESSOR IN THE POCAHONTAS FIELD



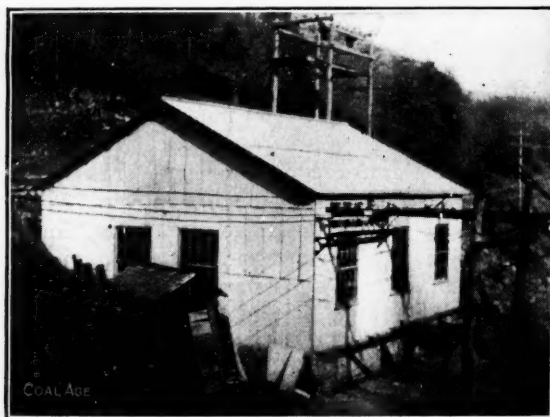
SUBSTATION SUPPLYING POWER TO ROLFE COLLIERY

By taking advantage of the natural flow, as indicated by the minimum of government records for many years past, a development of at least 90,000 hp. is possible, and this can be largely increased by the creation of two storage reservoirs in the upper reaches of the river. Furthermore, the entire drainage basin is heavily timbered, insuring a comparatively even, constant run-off during all seasons of the year; and this is one of the most important advantages of the location both to the power company and to the collieries which it serves.

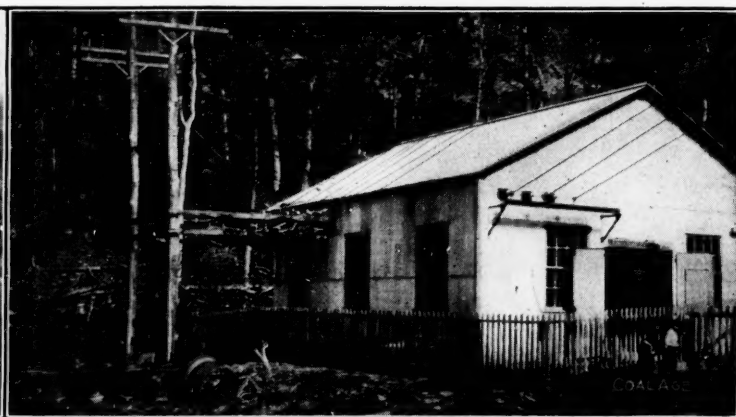
Of the four power sites already selected, it was deemed advisable to undertake the development of No. 2 and No. 4 first. In constructing the headwork for station No. 4, advantage was taken of a long, narrow island in the

which keep out floating logs or other debris, ice, etc., and thence to intakes protected by steel headgates. The latter are normally raised or lowered by means of motors, but can be manually operated when required. The intakes, 13x21 ft., together with the wheel chambers and draft tubes, are moulded in the concrete which forms the foundation of the station. As the water issues from the hydraulic turbines, it flows down a tailrace 1800 ft. long, which has been blasted out of the rock.

The single vertical-shaft turbines, of the Francis type have each a capacity of 3000 hp. under the normal effective head of 34 ft. The speed is 97 r.p.m. Three of these units have been installed. Each turbine drives a vertical-shaft alternating-current generator of the umbrella type,



WEST MINE SUBSTATION OF THE POCAHONTAS CONSOLIDATED COLLIERIES CO.



SUBSTATION FURNISHING POWER TO JENKINJONES MINE

center of the stream. A spillway diversion dam of solid concrete, 15 ft. wide and 1000 ft. long, was built from the upper end of the island to the south bank of the river. This was securely anchored by a keyway blasted in the rock bed of the stream, into which the concrete monolithic structure is set.

By means of the dam the main flow of the river is forced into a narrow channel between the island and the north bank, which forms a natural forebay of about 2000 ft., leading to the power house below. The latter, a brick, steel-frame structure, 123x61 ft., is built up from the bed of the river, with concrete retaining and wing dams, and rests on a massive concrete foundation.

Water is admitted through trash racks set on an incline,

from the terminals of which three-phase, 60-cycle current, at 13,200 volts, is led to a double busbar switchboard system and thence to the step-up transformer station mentioned below.

The arrangement of the power plant, with the usual high-tension oil switches, control, intergrating and protective devices, circuits for local electric service, overhead traveling crane, etc., is thoroughly modern in every respect. The details, however, differ in no essential particular from those of other up-to-date stations and will not be gone into here.

It may be said, however, that everything has been greatly simplified, avoiding the complications unduly introduced into many of the latest plants. The switch-



boards are on the generator-floor level, with most of the high-tension apparatus in a gallery just above. Excitation is furnished by two direct-current generators, which are also driven by waterwheels of suitable capacity.

In building No. 2 station advantage was taken of a narrow rock gorge, across which a solid concrete dam 504 ft. long, 56 ft. wide at the base and with an average height of 50 ft., was constructed. Between the western end of the dam and the river bank a brick, steel-frame power house, 170x50 ft., was placed on concrete foundations, with a concrete wing and core wall.

Above the power house a cut was also made for a 200-ft. overflow dam for flood times, the spillway of which discharges to a natural sluiceway formed by a depression beyond the west bank of the gorge. This sluiceway was also built up with a concrete retaining wall where necessary. The arrangement of the power house is almost identical with that of No. 4 station above described. It, however, contains four units, working under 49.5 ft. head, at 116 r.p.m., whose normal output in electric energy is 20,000 hp. There are also two waterwheel-driven exciters.

The electric current generated in both stations, at 13,200 volts, is transmitted over either section of a duplicate line system to a separate transformer station adjacent to No. 2 plant, where it is stepped up to 88,000 volts for transmission to the coal fields and other points of consumption.

The transformer house is a steel-frame brick building, 88x44 ft., containing four 6000-kv.a. units of the water-cooled, oil-insulated type. These are set in separate brick compartments, and mounted on trucks, so that they can be rolled out when required and made accessible to an overhead traveling crane. A pit is provided in which to lower any transformer for inspection and repairs. The incoming and outgoing lines are equipped with electrolytic lightning arresters and remote-control oil switches; and storage batteries guard against any failure of current for operating the latter.

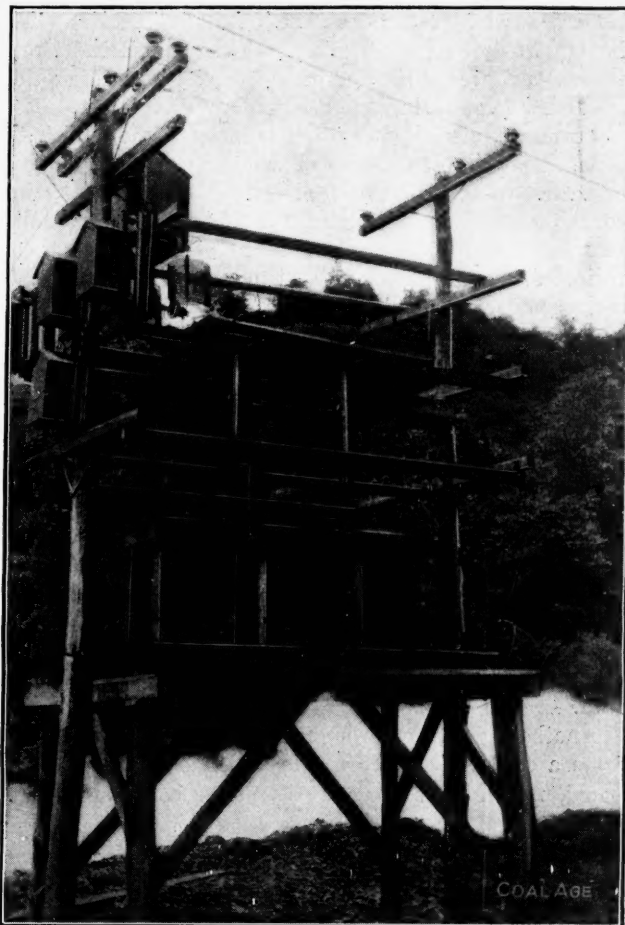
The 88,000-volt transmission system consists of 237 miles of high-tension cable. There are also 165 miles of the 13,200-volt distribution lines, besides the network of wiring from the substations served by the latter to the properties of the mining companies and others using the power. All of the lines are in duplicate, to avoid any possible interruption to the service. Aluminum cables are used throughout. These are suspended from four-disk insulators upon 45-ft. chestnut poles, cut in the district, which bear oak crossarms of the wishbone type.

The system is spread out like a fan from the transformer station. There are three distinct lines radiating in different directions; and one important cross-connecting line which gives the effect of a "ring" system. What is known as "A" line runs from the main transformer station 50.3 miles through Bluefield to Switchback. "D" line runs 69.4 miles to Roanoke. "E" line extends 51 miles to Marion and Saltville. From Switchback "C" line forms a branch to Coalwood, 16.5 miles distant. "B" line connects Switchback with "D" line, via Pulaski, a distance of 50 miles.

There are seven 88,000-volt substations, and 15 of the 13,200-volt distributing stations, with nearly a hundred banks of transformers. Private telephone lines, installed on the transmission-line poles, connect the entire system; and telephones are placed in each of the 88,000-volt and

13,200-volt substations, as well as at the receiving stations of the principal collieries served with power. All load dispatching is done directly by telephone from the transformer station at Byllesby in the vicinity of the larger generating plant.

This concentration gives the system the advantage of absolute control at a single point, where one man, the load dispatcher, handles the distribution of current over all of the trunk lines, branches and feeders, so that any neces-



OPEN-AIR TRANSFORMER STATION SUPPLYING MINE MOTORS AND PUMPS

sary switching combinations can be made or any part of the system isolated in cases of emergency. It is planned, when plants No. 1 and No. 3 are built, to also pass the current from them through the main transformer and control station at Byllesby, which is so laid out on the unit method that it can readily be enlarged and its equipment extended.

At the 13,200-volt substations, the current is stepped down in transformers to 2300 volts for distribution to the collieries and other plants using it. By means of motor-generator sets or rotary converters it can also be furnished as direct current, some of which is necessary for haulage and other purposes in and about the mines and surface plants.

The use of electric power in the Pocahontas field is nothing new, and a number of first-class steam-driven plants for the purpose have been installed; but the tendency is at present to ship out most of the coal which was formerly burned under boilers; hence the advent of hydro-

electric power, at relatively low cost, has been generally welcomed.

The question of daily expense, however, is not the controlling factor. Water power is making its way even over cheap steam power because of its reliability and is enabling mine operators to eliminate future investments in generating plants, as well as to avoid the employment of skilled engineers and station attendants, whom it has always been difficult to secure or retain, owing to the remoteness of the mines from community advantages. A much lower grade of employees can now be used for the limited service required at the receiving stations. The introduction of circuit-breakers, which automatically reset themselves after a predetermined length of interruption, is further simplifying the need of any attendance.

Formerly, also, it was often necessary to establish the isolated power plants for collieries in locations difficult of access, to which boiler feed had to be pumped against considerable heads, or where a decidedly inferior quality of water had to be used, and tube-clogging, scaling, corrosion, etc., and other similar troubles were frequent.

In contrast to all this, with a constant supply of current, equalized among a large number of consumers, there exist the material advantages of good load and power factors over the entire system, close regulation of voltage and a practically assured supply of energy under all conditions, whether during regular shift periods, overtime, shut-downs, or for momentary or prolonged peak loads. The ability to obtain any amount of power required at any time, whether much or little, becomes of particular importance in the case of machinery such as pumps which need to be kept going even when all other apparatus is idle, as well as for lighting and various intermittent or auxiliary service, which is unduly expensive when dependent upon an isolated power plant running at fractional load.

Another advantage brought about by the use of current from a central system was one that had not been anticipated, namely, the economy in power consumption and better regulation of driven apparatus consequent upon suitable speeds. To take ventilating fans, for example, it will be recognized that the running speeds were likely to vary considerably when not so intended, due to the fact that most of the fan engines were governed by throttling. When motors were installed, however, care was taken to select those of just the right characteristics, with constant or easily regulated speeds to meet the exact requirements of the service. Similar analogies can readily be followed out in the case of other classes of machinery.

A little more than 18,000 hp. is now being taken for coal-mining operations from the system above described, the heaviest user being the Pocahontas Consolidated Collieries Co., which is also the largest single operator in the fields. A. E. Gregory, of the Appalachian Power Co., with headquarters at Bluefield, W. Va., is in charge of all the arrangements for the service, which under his direction is being rapidly extended.

The engineering and construction work for the hydro-electric generating plants and entire distribution system was carried through by H. M. Byllesby & Co., of Chicago; but the present operating engineers are Velie, Blackwell & Buck, of New York City, with G. G. Wilder, Bluefield, W. Va., as manager.

## The Spirit of Management

BY BERTON BRALEY

Adapted from a poem published in "American Machinist."

We've done with the days of "hit or miss"  
When we blundered along in careless bliss,  
In frantic hurry and foolish haste  
With useless labor and senseless waste;  
We've done with the days of "more or less"  
When we worked by chance and we planned by guess  
And we've learned there's more to a workman's job  
Than putting him down where the mine's athrob,  
With pumps and motors in vast array,  
And letting him blindly feel his way!

For now we study and now we plan  
The work and effort of every man,  
The reason "Why" and the manner "How,"  
To lessen the sweat of his back and brow,  
Relieve his muscles of stress and strain  
And lighten the task of his harried brain;  
To give him leisure for rest and fun  
While swelling the sum of the work that's done!

We must show the Miner the work to do,  
The WAY to do it, until he KNOWS;  
We must give him the mighty spirit, too,  
By which the World in its wonder grows;  
For the Spirit of Modern Progress comes  
From men with bodies and minds kept strong,  
Not puny weaklings from out the throng  
Who swarm in ghettos and fetid slums!

And so, at last, we have come to learn  
That the Health of miners is our concern—  
That it's our concern as Fellowmen  
And brothers all, in a world that's wide,  
Where we rise and fall and rise again  
Like soldiers battling side by side;  
And 'tis our concern in a selfish light  
For men work best when they're fully fit,  
With minds untroubled and calm eyes bright,  
And bodily vigor and clear, keen wit!

So here's the gospel—to do our work  
With little fretting or fuss or irk;  
To train the toiler, wherever placed,  
To labor wisely and not to waste;  
To give men pride in the work they do,  
To pay them well when the job is through,  
And to hold their welfare and strength and health  
As source and font of our truest wealth!

That's first-class gospel, because it's fair  
Because it's good for the human race,  
Because it moves us to do and dare  
And quickens the world on its forward pace,  
Because it brings us to better ways,  
And so—in the long, long run—IT PAYS!

❧

The Peruvian government has granted sundry French capitalists permission to draw up a plan for a railway starting from Sayan and terminating in the carboniferous basins of Oyon and Cheras.

# Safety in West Virginia

BY FRANK H. KNEELAND

**SYNOPSIS**—Some of the means employed by the United States Coal & Coke Co. to prevent accidents.

To increase the output from 100,000 tons to 400,000 tons, on the average, per each fatal accident underground, to mine over a million tons of coal without a single fatality, to operate a mine for almost two years, without a serious mishap of any kind, shipping meanwhile over 750,000



FIG. 1. A DRIFT, MOUTH, FAN AND SUBSTATION

tons of coal, to render its operations safer than the mines of either Great Britain or Belgium, and approximately one-third as hazardous as surrounding collieries, are a few of the results attributable to the campaign for safety which has been waged by the United States Coal & Coke Co., of Gary, W. Va., during the past four years.

Such progress as this, in face of the many difficulties, such as the explosibility of gas and dust and the dangers from drawslate, rash and kettle-bottoms encountered in

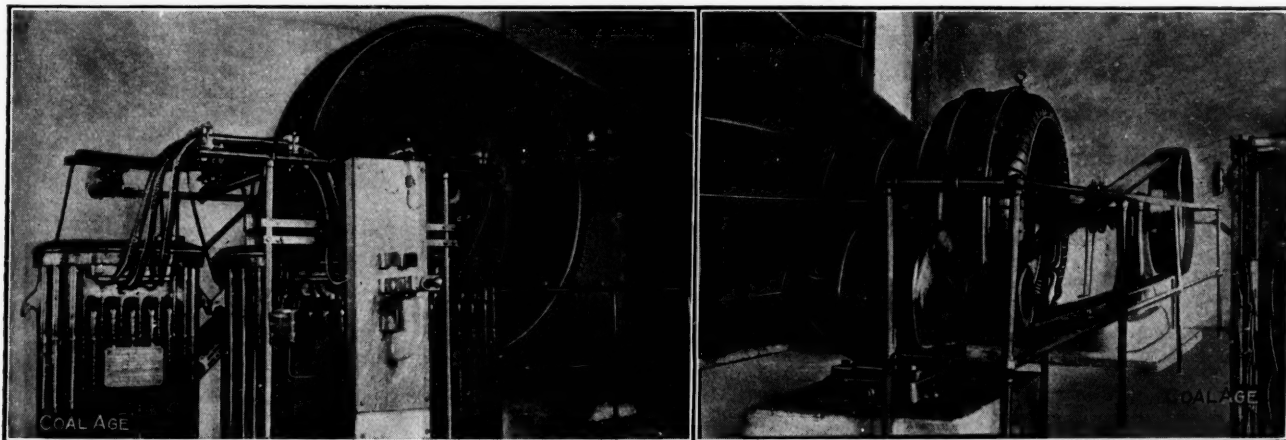
vention. Accidents underground will be dealt with subsequently.

Accidents occurring with machinery may be forestalled by two distinct and widely dissimilar means, neither of which is in itself inadequate. The first of these has to do with each particular piece of mechanism itself, while the second deals with the mental attitude of the workman. In other words, the two means to be employed for accident prevention with machinery may be designated as safety appliances and morale.

The end sought in the design, construction and application of safety appliances to machinery and mechanical devices, is a single one; namely, to render dangerous contact, intentional or otherwise, between the attendant's person and the moving parts of the machine impossible. The forms which devices to accomplish this end may take, however, are veritably legion, and embrace everything from headless or hollow setscrews to elaborate guards completely incasing and insulating an entire machine from its operator.

The accompanying illustrations give an idea of some of the many devices employed by this company for this purpose and are for the most part self-explanatory.

The passenger car shown in Fig. 4 is used to haul the miners from the town of Anawalt, located in a valley, to the mine up an incline approximately 1200 ft. long. It is provided with a safety catch not shown in the drawing, controlled by a fly-ball governor, which releases two



FIGS. 2 AND 3. TWO VIEWS IN SUBSTATION SHOWN IN FIG. 1. NOTE PIPE HANDRAILS AROUND MACHINES AND BELTS

the Pocahontas region, could only be accomplished by the exercise of painstaking care and eternal vigilance.

The accidents occurring at a coal mine may be broadly divided into two classes; namely, those which happen underground and those which transpire upon the surface. Underground, the principal danger arises from falls of roof and coal, and from electrical apparatus, such as trolley wires, machine cables, etc. Above ground, the workman's greatest peril is from machinery. The present article will deal with this latter danger and the methods employed by the above named company for its circum-

vented jaws, gripping two auxiliary oak rails, should the speed at any time exceed a certain predetermined amount. Hand trips are also provided at either end of the car.

The automatic release is periodically tested by allowing the empty car to attain, during descent, the critical or trip speed. The same experiment is less frequently repeated when the car is loaded to its normal capacity with rock or other inanimate weight.

At the present time it is the endeavor of this company to purchase all new machinery adequately guarded, where possible. Many machines now in use were, however, on



hand before the active campaign for safety started. For these it has been necessary to design and construct suitable guards for the dangerous parts. Various materials and types of guards have been tried from time to time, the designs being constantly improved and reduced to what might be termed standards.

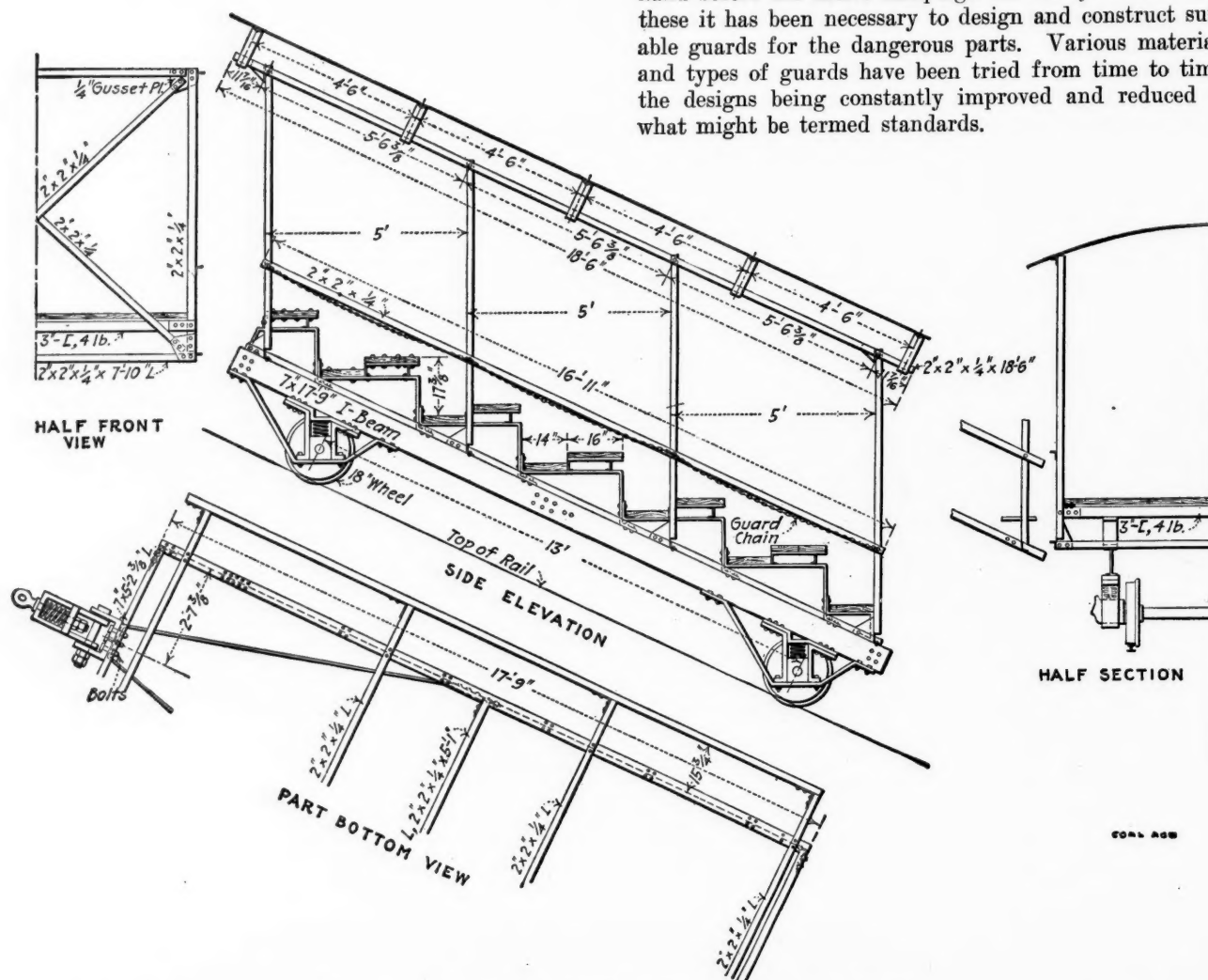


FIG. 4. INCLINE CAR FOR HAULING MINERS TO WORK

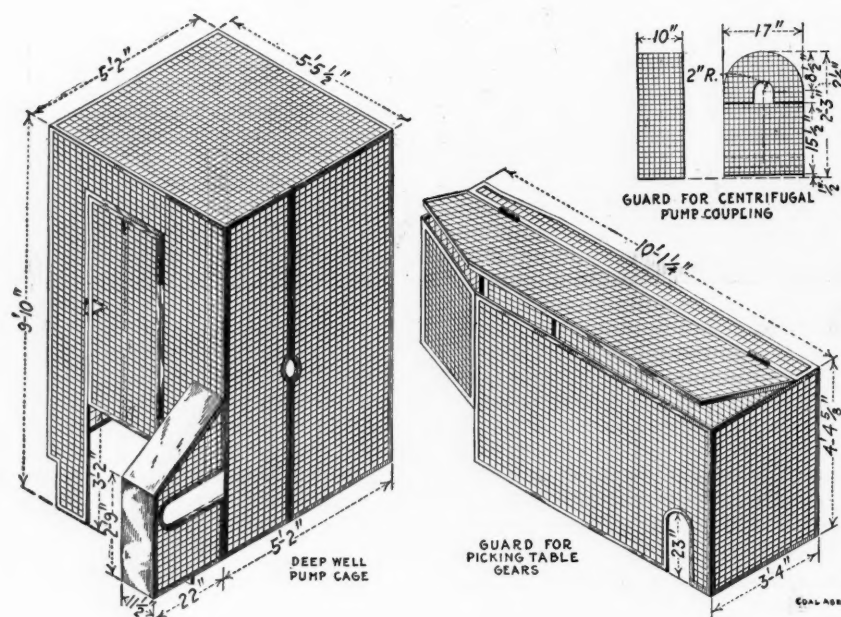


FIG. 5. GUARDS FOR A DEEP-WELL PUMP, PICKING-TABLE GEARS AND A PUMP COUPLING

Take, for example, such a dangerous piece of mechanism as the reducing gears between a picking table and its driving motor. For such places, wooden guards are both unsightly and combustible. Pipe handrails are much better, but cannot ordinarily be easily and quickly removed or returned to place in case of repairs requiring complete access to all gear parts. Sheet-iron cases are still better, but obscure the gears when in place, and have a marked tendency to chatter noisily under even slight vibration.

At the present time, heavy wire netting, carried on angle- or channel-iron frames, which may be easily unfastened from each other and thus removed, is considered standard. These guards not only absolutely prevent contact with the gears, but are neat in appearance and permit the moving parts to be at all times easily seen. Such guards are shown in Figs. 5 and 6.

For guarding pulleys and belts and many other similar pieces of mechanism, the simple pipe handrail is found very satisfactory. A few of the many applications of this type of protection may be seen in Figs. 2, 3 and 7. For protection against vertical belts, particularly in machine shops, a frame of strap iron is often employed.

rather one which is most frequently responsible for fatalities around machinery, is a revolving projection, such as a setscrew or clamp collar upon a shaft. A feather or spline, or even an open keyway, may also be the means of catching a workman's sleeve or other part of his clothing, with disastrous results.

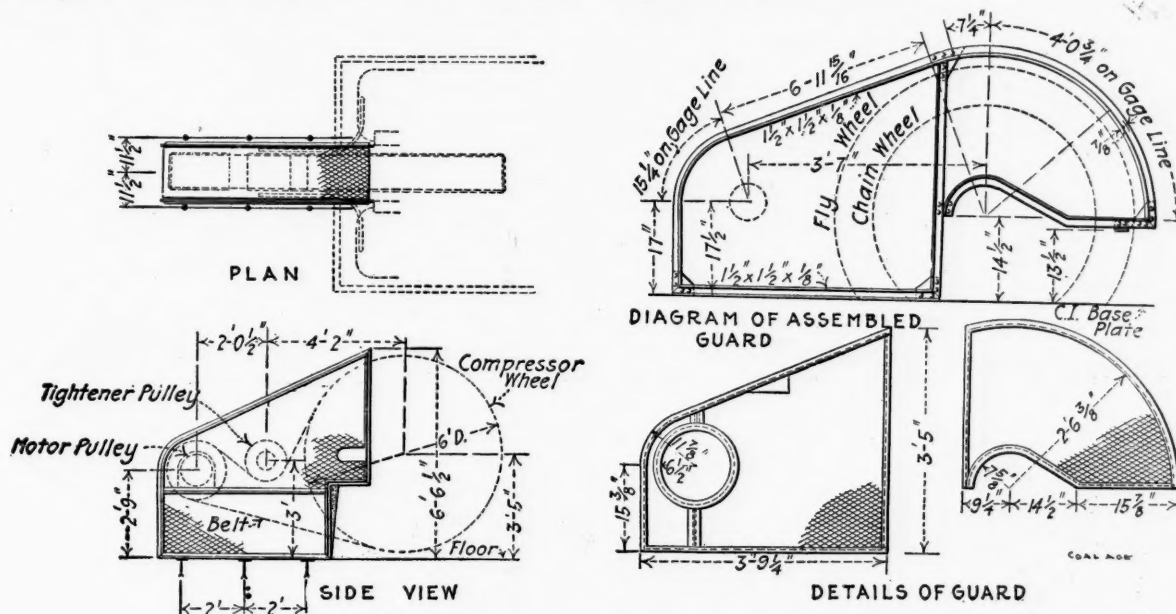


FIG. 6. TWO GUARDS FOR DRIVES TO AIR COMPRESSORS

Here, also, when a gear guard is either rigidly or movably attached to the machine, it is frequently made of a frame completely covered with sheet iron. This is not altogether objectionable where skilled labor is employed and careful inspections are regularly made. Belt and gear guards of the above named type are shown in Figs. 8, 9, 10 and 11.

One of the most dangerous pieces of mechanism, or

In the practice of this company, exposed collars must be smooth with no sharp projections. Such parts are now manufactured and sold as safety collars. Feathers which are so located as to be dangerous are guarded, and keyways similarly placed are filled up.

First-aid teams have been organized at the various mines and first-aid cabinets are conveniently located at shops, substations and tipples. These are, however, un-

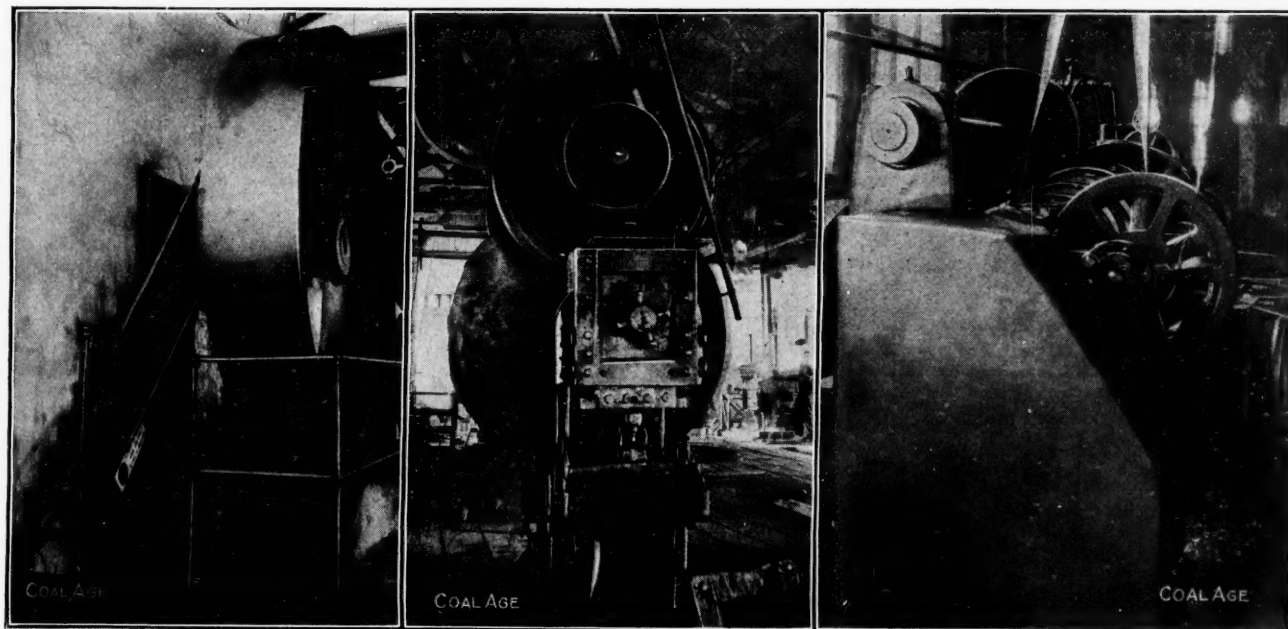


FIG. 7. RAIL AROUND FAN PULLEY AND BEARING

FIG. 8. GEAR GUARD ON A PUNCH AND SHEAR

FIG. 9. GUARD OVER CHANGE GEARS ON A LATHE

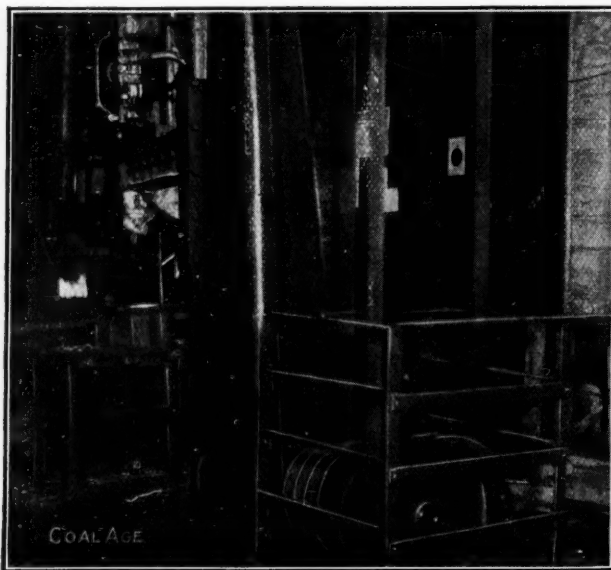


FIG. 10. BELT GUARD ON A RADIAL DRILL

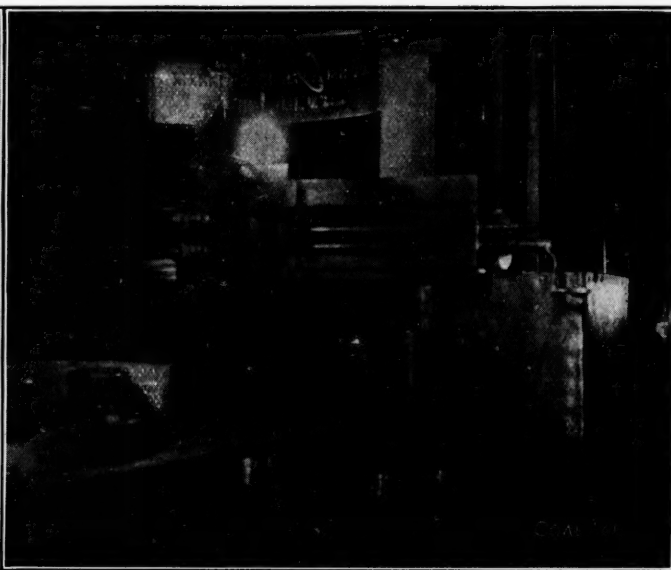


FIG. 11. SHEET-IRON BELT GUARD ON A PLANER

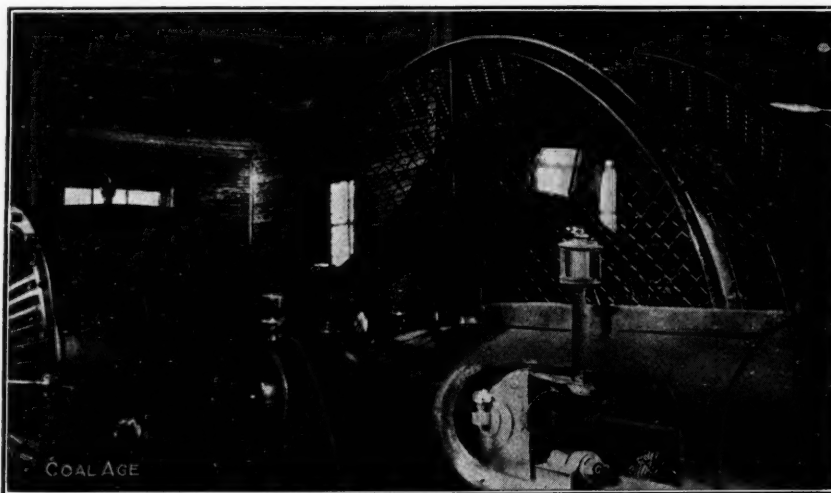


FIG. 12. NETTING GUARD OVER SILENT CHAIN DRIVE FOR AN AIR COMPRESSOR

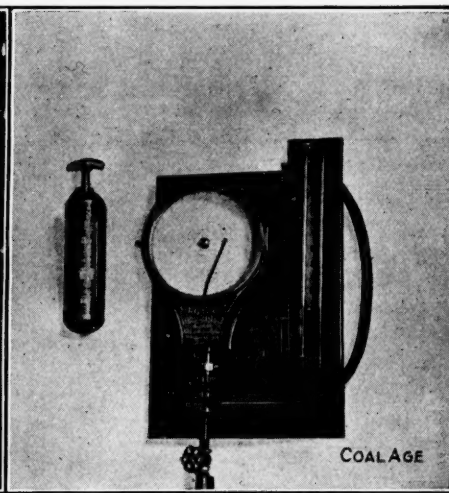


FIG. 13. INDICATING AND RECORDING WATER GAGES ON A MINE FAN

welcome precautions, as the primary intention is to prevent accidents, not to take care of their effects. It is recognized, however, that some accidents will unavoidably occur, and in such cases no expense or effort is spared to quickly and effectually alleviate the suffering of the victim and render his recovery prompt and certain.

Here as elsewhere in the plants of the Steel Corporation many valuable suggestions have been received from the workmen themselves. It is freely acknowledged that the appointment of safety and works committees has done much to avert mishaps of all kinds. One great step, perhaps the greatest, toward industrial safety, has been taken

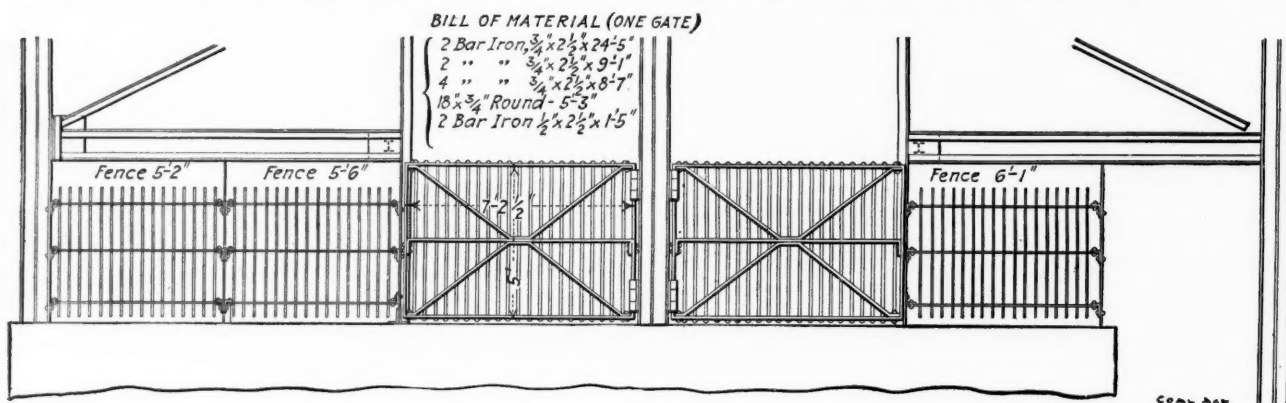


FIG. 14. IRON FENCE AND GATES AT A SHAFT MOUTH



when the workman himself becomes thoroughly alive to his own responsibility for danger and dangerous practices.

By means of danger signs, placards and illuminated safety mottoes and warnings, but still more by careful training and example, the management of the United

## Connecting Motors to Mine Fans

By H. J. BOOKER\*

**SYNOPSIS**—It is frequently advantageous in mine ventilation to be able to shift the fan drive from one motor to another. Two such arrangements are here described.

The successful connection of two motors to a mine fan so that an auxiliary motor is always ready and can be brought into service without stopping ventilation is claiming the attention of a number of mine managers and mechanical engineers throughout the coal fields today. The accompanying illustrations show how the writer accomplished this result in a satisfactory manner.

Fig. 1 shows a large double-inlet reversible mine fan. The motors are so arranged that either can be disengaged when in service without shutting down. To shift from one motor to the other, it is only necessary to start the one to be used and change the clutches. This can be done without any appreciable variation in the speed of the fan.

The fan shaft is continuous; the hub of the friction-clutch pulley is fitted with brass bushings, and ample means for lubrication are provided, so that the latter may run loose on the shaft. The clutch hub is keyed to the shaft and the motors are belted to the fan as shown.

It has been found in practice that this is a much better plan than to make the fan shaft in three pieces joined together by means of clutch couplings to be thrown in or out when changing motors. The reason for this is apparent when the weight supported by the fan bearings as compared to that resting upon the clutch and pulley bearings is considered. The fan bearings naturally wear down the faster, making it impossible to keep the three segments of the shaft in line. This causes considerable bearing trouble, which necessitates frequent shutdowns.

\*Monongahela, Penn.

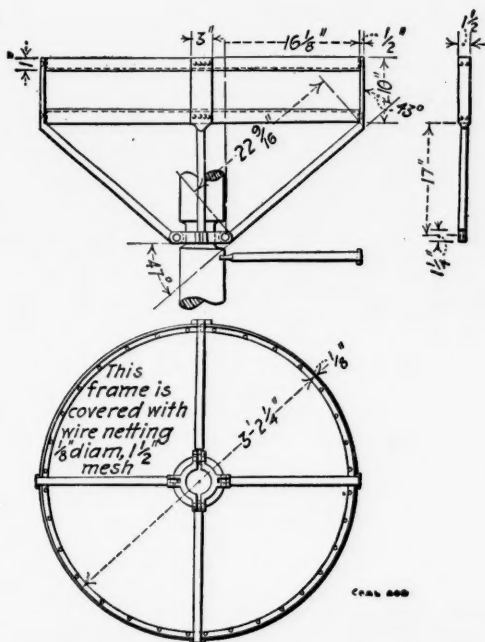


FIG. 15. GUARD FOR GOVERNOR ON CORLISS ENGINE

States Coal & Coke Co. constantly strives to bring home forcibly to every man in its employ the perils incident to his daily work, and the importance of eternal vigilance and caution in an industry as inherently dangerous as that of coal mining.

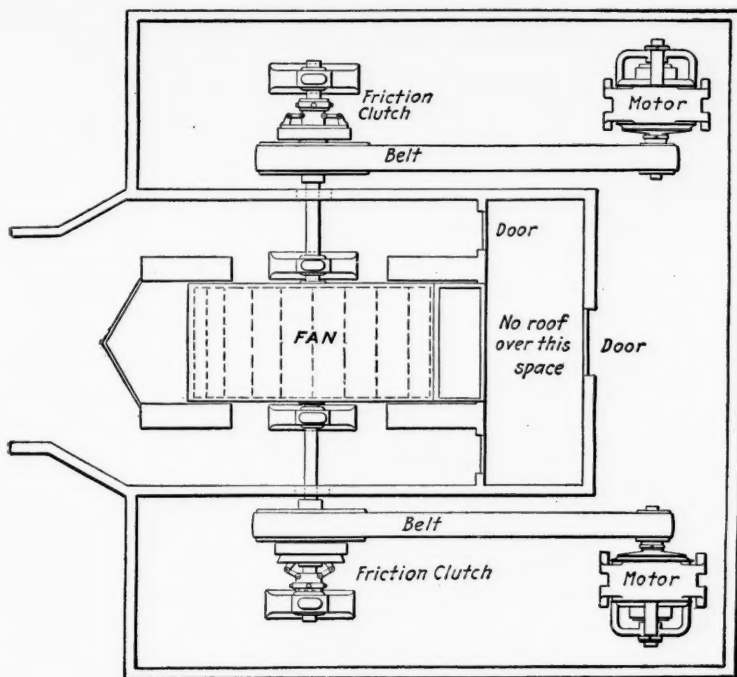


FIG. 1. TWO MOTORS BELTED TO A DOUBLE INLET FAN

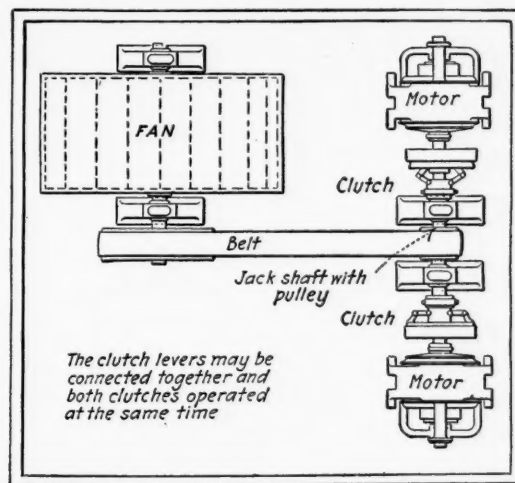


FIG. 2. MOTORS BELTED TO A SINGLE INLET FAN

Fig. 2 shows a small single-inlet mine fan to which is connected two motors, either of which is of ample power to drive it to its full capacity. In this arrangement the motors are connected to a jackshaft by friction clutches. The jackshaft carries a pulley to which the fan is belted. By this method the operator can change motors without allowing the speed of the fan to vary as both clutches may be operated simultaneously.

#### METHOD APPLICABLE ALSO TO DOUBLE INLET FAN

This method may be employed to drive a double-inlet fan similar to that shown in Fig. 1, but the two-belt arrangement is preferred since if the bearings on the jackshaft give way, the fan will be out of commission and

there is less danger of the large fan bearings giving trouble than those of the high-speed jackshaft.

Either of the above systems will give satisfactorily service with a reasonable amount of attention, without which no equipment can be expected to give good results.

With the arrangement of motors and shafts outlined above, three means for power transmission are available, namely, belts, ropes and silent chains. Of the three, the writer prefers a sole-leather belt, which, if properly cared for, will last several years. Ropes are satisfactory for power transmission, but do not last well. They have a way of giving out when they are most needed. One year appears to be about the average life of a rope in continuous service on a mine fan.

## The Indianapolis Convention

*SYNOPSIS—With only about a dollar to spend per man on a possible strike in the spring, the United Mine Workers of America was inclined to be conservative, though men were present who figure every dollar over a hundred times and found use for all. There is plenty of evidence that the direct-action element will soon replace the socialists as disturbers in the organization.*

The first biennial convention of the United Mine Workers of America met at Indianapolis, Ind., on Jan. 20. In the afternoon a motion was made, but not carried, to suspend the rules so as to permit a vote to be taken on removing the convention to some other city, as a rebuke to the Chamber of Commerce and the business men for their stand in the recent teamsters' strike.

It will be remembered that Mayor S. L. Shank, of Indianapolis, was compelled to resign for his weakness during the street-car strike, and H. R. Wallace, the city comptroller succeeded him. Five hundred business men were sworn in for special service, one hundred being mounted guards. Order being restored, the strike utterly failed, and it was this strong defense of law and order which angered some of the miners' leaders.

At the morning session, Vice-President Miller of the Central Labor Union presided, and addresses of welcome were made and sergeants-at-arms and messengers appointed by President J. P. White. A resolution was passed, calling on Congress to investigate the Colorado strike, and, to present the matter more effectively, S. L. Montgomery, of Charleston, W. Va., and W. L. Farley, of Pratt City, Ala., were delegated to proceed to Washington at once with the resolution.

President White presided at the afternoon session and only business of a routine character was transacted, such as the reports of the rules committee and of the officers of the organization. The report of the president was an extremely conservative document. He has realized what a drain has been caused on the treasury by the expenditures in West Virginia, Colorado and Vancouver Island during the past year. As one has failed and the others seem about to come to a disastrous end, there is nothing to make the president buoyant. There has been continued strife and no prospect of any immediate return in dues from the sections affected.

#### STRIKE FUND IS EQUAL TO 73c. PER UNION MAN

Secretary-treasurer Green showed incidentally why conservatism must have the approval of the Union officials. The paid-up membership was 377,682 in December, 1913. In the past two years \$2,328,167.87 has been expended for relief, and there is now a balance of \$278,032.30. This seems a fairly large war chest till it is divided by the number of members. The figure obtained by such division is 73c. When we recall the costs of the convention, and the fact that two costly strikes are underway, we can hardly anticipate a long and costly strike this spring. If such a suspension occurs, it cannot be dignified as a strike. The whole reserve fund of the organization in December, 1913, would only provide \$1 for each bituminous mine-worker, for there are 277,506 of these men in the union. However, there is enough money on hand for aggressive agitation.

#### CRAFT ORGANIZATION VS. INDUSTRIAL UNIONS

The second day developed the latent struggle between industrial and craft unionism. The American Federation of Labor has been unionizing crafts. Thus, in organizing the mining industry after the Federation model, the miners would have one organization, the loaders probably another, the machine runners a fourth, and so on. But most of the unionmen today believe that this promotes strife between crafts, and certainly does not permit a united front to be presented to the mine owners. They desire to organize by industries and not by any smaller units.

The American Federation of Labor has been regarded as an aristocratic concern, anxious to uphold the craftsmen and having little interest in the unskilled workmen. The industrialist declares that when the latter is unorganized, he aids in strike-breaking whenever a dispute arises.

This accounts for Duncan McDonald, of Illinois, attacking S. P. Gompers and Thomas Kennedy, of Hazleton, Penn., declaring that almost every delegate to the Federation has been insulted. An attack on Secretary of Labor, William B. Wilson, also shows the divisions in the United Mine Workers of America.

Frank M. Ryan, of the International Association of Bridge and Structural Workers, thanked the miners for their assistance and urged that conspiracy was just as

permissible for the poor as for the rich. He did not say, however, that the conspiracy of which he was convicted was one to transport explosives illegally in connection with several bomb settings in which life was menaced.

#### SOME USES FOR THAT 73 CENTS

On the third day the Louisville, Col., local urged that all available funds of the union be used to purchase mines, and that as funds be obtained, all the mines of the country be bought and operated by the union. Other resolutions urged that old-age pensions and a home for disabled miners be established. The Bear Creek, Mont., union wanted coöperative wholesale supply houses started under the auspices of the union. A much larger number favored the construction of an executive office for the organization and the establishment of a plant for printing the *Mine Workers' Journal*. They propose that when the strikes are at an end 50c. be collected from each member every month until \$500,000 is collected.

A resolution was passed after much debate that "the time had arrived, owing to the present economic conditions and the machinations of the interests in many places, for the laboring people to come together in a political party." Several socialists were anxious to annex that approval, notably William Hynes, of Fayette City, Penn., and Preston Gunnoe, of Peytonia, W. Va., but no party was designated.

#### J. P. WHITE LOSES NOMINATING OF SCALE COMMITTEE

On the 23rd, the delegates took from J. P. White the nominating of the scale committee, on the ground that the officers of the organization had not "worked in the mine for a few years and did not know the working conditions like the men at the face of the coal." It was decided that the scale committee should be elected from the floor of the convention.

There followed a fierce onslaught on the making of contracts with operators. An advocate of the Industrial Workers of the World, from Virginville, W. Va., presented a resolution declaring that "fake labor leaders" with false methods were tying the miners with long-term agreements." He believed in the general strike, such as he alleged had been so successful in England.

#### THE OPPOSITION TO MILITARISM

A representative from a Virginia local union located at Pocahontas was expelled from the meeting, as it was declared that the local was a spurious offshot formed by Baldwin-Felts detectives and not by real miners. Several delegates protested against the army, militia and boy scouts, and a resolution was presented opposing the enlistment of any of the members of the union in the militia and condemning the boy-scout movement.

Another resolution provided for a general strike in case of the United States engaging in war. A six-hour day so as to give work for everybody was also urged. However, the men were disposed to be conservative, and doctrines now popular in Europe received little approval.

The miners did, however, vote in favor of compelling all mine carpenters to give up their membership in the Brotherhood of Carpenters and Joiners, and W. O. Green, the secretary-treasurer, said that organization was favorable to the move.

#### MOSTLY POLITICS

On the 24th, the meeting passed a resolution favoring

Federal mothers' pensions, old-age pensions, liability and compensation laws. The miners of East Charleroi, Penn., presented a resolution urging the discontinuance of the use of electricity underground, and the resolution was adopted in substance and referred to the different districts for settlement. Another resolution introduced importuned Congress to pass a law making it unlawful for any person, firm or corporation to import into a strike district any strike-breakers, nonunion workers, detectives, or gunmen. The same resolution called for laws prohibiting the use of state troops in strike districts.

On the 26th, the meeting settled down into the harness by passing a resolution in favor of the initiative, referendum and recall, and providing that the recall be applied to constitutional amendments and that judges be prohibited from declaring unconstitutional laws which have been passed by the people.

Much disgust was expressed that time worth \$1500 was expended on solving whether the miners of Coffeen, Ill., or of Fallon in the same state should pay a doctor's bill of \$74.45. James Lord was elected president of the mining department of the American Federation of Labor and put on a salary. He will be located in Washington, D. C.

#### SHORTER HOURS AND FEWER ALIENS

The organization passed a resolution favoring a shorter work day until all surplus labor is employed, and an enactment of law prohibiting immigration from any country till that same result is assured and a resolution requiring certificates of competency as miners of all employees who wish to work in the mine. The resolutions committee offered a resolution, which they had amended, favoring municipal employment agencies and eliminating private labor bureaus. Federal mine-safety laws were demanded in an adopted resolution.

On the 27th of January the international executive committee was empowered to appoint a committee to meet a similar body authorized by the Western Federation of Miners. These committees are to discuss amalgamation of the two unions, and if the plan is agreed on, it is to be submitted to a referendum.

The following day was wasted by Duncan McDonald, who made a severe attack on S. J. Gompers, calling him a liar, slanderer and poltroon, accusing him and the executive board of the American Federation of Labor of drunkenness. After preparing to leave, Gompers managed to reply to his critics. Later, the miners reindorsed woman suffrage, discussed a plan to reduce representation at conventions and refused to approve of the resolution excluding unionmen from the militia.

#### DELEGATION TO BE REDUCED

On the 31st, while alleged to be feeling quite sore at the extravagant expense (\$15,000) resulting from the debate between McDonald, Moyer and Gompers, the delegates nevertheless made little progress. It was alleged that 30 interlopers had been planted by a Pittsburgh detective agency to create disorder.

The committee on resolutions advocated, however, a reduction of the delegation to conventions. They recommended that one delegate be elected for every 1000 members, in all only about 383 men, instead of more than 1500 as at present. The organization voted not to permit the money of locals to be spent in aid of any strike,



unless the strike was indorsed by the American Federation of Labor, or an affiliated organization. This will bar the Industrial Workers of the World from Union support.

J. A. Holmes, director of the Bureau of Mines, and W. D. Ryan, former secretary-treasurer of the United Mine Workers, and now with the Bureau, both spoke and were well received.

On Monday, Feb. 2, the miners met at the German House, Tomlinson Hall having been previously engaged for a poultry show. The day was largely wasted over a wrangle about the auditing expenses, and the sinister causes said to be back of criticisms of the auditors.

The convention passes over to the third week without notable results. Gompers is to be credited with some judgment in saying—"Taking the newspaper reports as a criterion, the most important work this convention has done has consisted of attacks on the American Federation of Labor and its officers, and discussing whether the president's salary shall be increased \$1000 a year." Nothing has been accomplished and two weeks have passed. The only things essayed are what the United Mine Workers cannot do, the regulation of street-car traffic being a case in point. It is estimated that every roll-call costs \$11,000.

#### DECISIONS EXPECTED

Apparently, there will be a demand for an increase of 10c. per ton on mine-run coal. Engineers will ask an increase of \$20 a month, and firemen, blacksmiths and other topmen will demand 25c. a day more than before. A similar increase will be asked for drivers, trip riders, timbermen, track and pumpmen, motormen, trappers and other inside workers. The scale committee is also considering an increase, for all men who receive less than \$2.25 a day, proportional to the raise in wage demanded by the miners. There is a proposition to advance the wage scale of all surfacemen, so as to make it equal for all employees.

The pushing of cars promises to be a vexed issue, and the workers will probably refuse to incorporate in their scale the Cleveland agreement, that nothing shall be demanded in the management of mines which will increase the cost of production.

The operators of the central competitive field, covering western Pennsylvania, Ohio, Indiana and Illinois, have been asked to meet the scale committee in joint conference at Philadelphia, Tuesday, Feb. 10. The district convention at Pittsburgh is set for the same week and must be deferred, but it is hoped that the Illinois district convention can be held on Feb. 17 as scheduled.

### Proposed Law for Kentucky Coal Mines

#### SPECIAL CORRESPONDENCE

The following proposed legislation, under the caption of House Bill No. 332, known as an Act to regulate the employment of physicians and surgeons by companies and corporations operating coal mines or lumber mills in the State of Kentucky, was introduced in the General Assembly at Frankfort, Ky., Jan. 28, by Representative W. M. Webb, of Johnson County. It reads as follows:

Section 1. That when it becomes necessary for any company or corporation owning or operating a coal mine or lumber mill in this commonwealth to employ a physician or sur-

geon to treat or attend the employees at said coal mine or lumber mill, in case of sickness or injury, that said physicians or surgeons shall be selected by the employees working at said coal mine or lumber mill by a majority of said employees working at said coal mine or lumber mill. That said physicians or surgeons shall be employed for a period of one year unless sooner removed or discharged by said company, upon the request of said employees, which shall be done upon petition signed by a majority of the employees employed at said coal mines or lumber mills; provided that a copy of said petition has been posted at the main entrance of each mine or at the mill of each lumber company at least ten days before it is presented to said employees for their signature. That the sum so paid each physician or surgeon shall be paid by said employees at the rate of \$1 per month for married men and 50c. for single men, which amounts shall be deducted from the earnings of the employees working at said coal mines or lumber mills, and that each married man's family shall receive the services of said physicians or surgeons without any additional cost.

Section 2. Any company or corporation violating said act shall, upon conviction, be fined not less than \$20 nor more than \$100 for each offense.

### Information Worthy of Your Most Careful Attention

During the next few weeks, the pages of COAL AGE will contain the most interesting and the most valuable assortment of articles ever arranged for coal-mining men. Among other things, we will publish a paper on coke manufacture, giving a detailed comparison of beehive and byproduct ovens. Valuable figures of operating cost will be included.

Then there will be articles giving complete data on a recent mine fire, methods of measuring gob temperatures, important details in connection with the construction of colliery plants, comparison of steel and wooden tanks for coal mines, description of a new and modern mine in Alabama, design and operation of a German coal-screening plant, signaling developments in British coal mines, methods of mining in Iowa, power plants at Westphalian collieries, steel vs. wood for supporting mine roofs, approved methods of mine surveying and the syndicate system of selling coal and coke.

There are a number of other articles already on hand and of equal value to any of the foregoing. Some of Mr. Braley's best poems, alive with human interest, will be printed in early issues. Then there are the coming wage agreements which will focus the attention of mining people. COAL AGE will cover all phases of this labor controversy as it has never been handled before. All the news of both factions in the contest will be published.

### Errata

A. R. Tibbits, who was rightly credited with the article on the Colorado output in 1913 (Jan. 10) is not one of the inspectors of coal mines of that state, but is employed in the office of John Dalrymple, who is the chief inspector of Colorado.

In our issue of Dec. 20 we stated that the Vulcan mine, which recently was the scene of an explosion, was located at Lafayette, Boulder Co., Colorado. There are two Vulcan mines, both belonging to the Rocky Mountain Fuel Co., one at Lafayette, and one at Newcastle. The Newcastle mine was the one which exploded. This mine is operated by the Coryell Mining & Leasing Co. The confusion, therefore, was easily made as in our mining list the Rocky Mountain Fuel Co. had only one Vulcan mine, that at Lafayette. The coal at Newcastle is bituminous not lignitic.

In laying out a boiler plant attention should be given to the space left between the fronts of water-tube boilers and the boiler-house walls or opposite faces of the range so as to enable tubes to be replaced and stokers to be run out for repair and renewal.

# Firedamp Reservoirs in Room-and-Pillar Work

BY FRANK HAAS\*

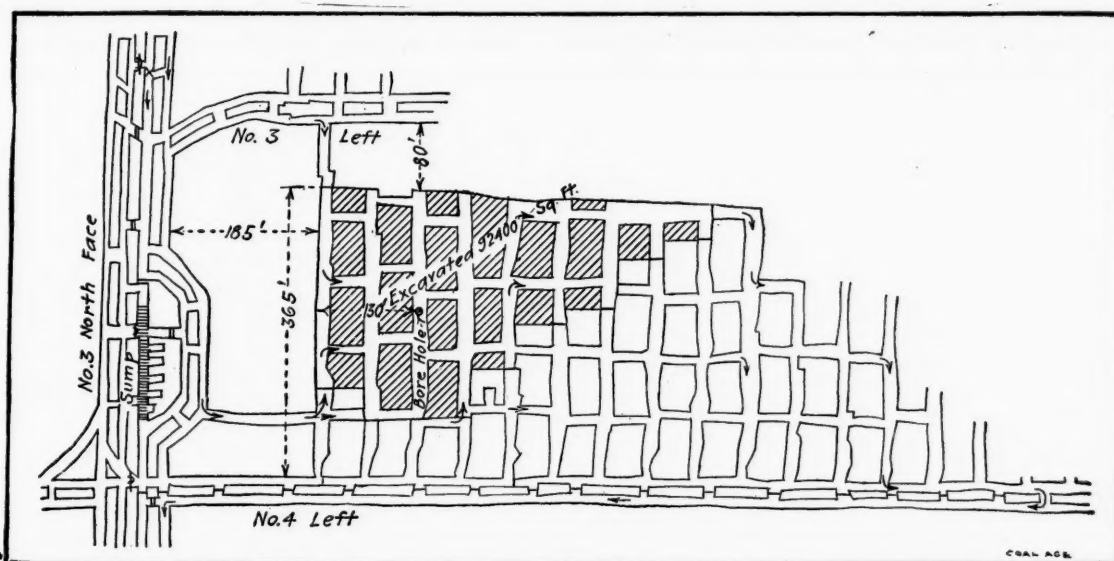
**SYNOPSIS**—Cavities above coal workings, when caving has taken place, often contain large quantities of gas which cannot be removed by ventilation; it is suggested, therefore, that holes be drilled for the purpose of tapping these reservoirs, which are a standing menace to the lives of the miners.

There is a general impression among mining men that since firedamp is found in coal seams, it evidently originated there and that the gases are continually given off by the coal. There seems to be some excuse for such an impression as many publications, and particularly those of foreign countries, tend toward this theory. Whatever

The height to which such stratifications break and fall depends on the area from which the coal has been removed and also on the nature of the overlying rocks, but it cannot be depended on to follow any fixed rules. Such crumbling and falling either continue until they reach the surface of the ground or if there is not an actual breaking of the surface, the measures will subside and fill the void caused by the removal of the coal.

## VENTILATION CANNOT REMOVE ALL THE GAS

It is plain, that until there is a subsidence of the surface by either cause, that there is a volume equal to the coal excavated which must be filled with air or any gas



SECTION OF MINE NO. 43, CONSOLIDATION COAL CO., SHOWING BORE HOLE

may be the case elsewhere, here in West Virginia, we know that the gas occurs below the coal seams and also above the seams, and that it is encountered in all the stratifications. Also, that the gas which we encounter in the mining operations is simply natural gas, perhaps altered somewhat in composition. Such gas is met in all excavations within coal mines, clay mines or stone quarries, and the amount will vary with the permeability of the strata and their local condition.

The method of mining coal in the Pittsburgh seam in the Fairmont region of West Virginia, consists in driving rooms from butt headings a distance of about 300 ft., and then removing the pillars between the rooms on a retreating system. The rooms are started successively, so that the line of advancement is at an angle of approximately 45 deg. with the butt heading and the retreating line of the pillars will be practically the same. The coal, being completely removed, leaves the roof locally unsupported, and such stratifications as are loose, break and fall into the space previously occupied by the coal or the lower roof stratifications.

\*Consulting engineer, The Consolidation Coal Co., Fairmont, W. Va.

which may leak in, and we find in certain localities that firedamp or natural gas does accumulate under such circumstances. The ventilating current of the mine when properly handled, has a tendency and does dilute and convey away in its current this gas, but the tendency is less and less as these falls increase in height and finally fails entirely, leaving a body of gas or mixture undisturbed. Such a condition is a menace and the greatest danger occurs when the final fall comes as a result of the subsidence of the surface, at which time this gas is forced out and into the mine more or less rapidly.

To drill a hole from the surface to the highest point or near the highest point in the fall was suggested as a remedy, but several features are involved which threw doubt on its practicability. In order to test out matters fully, such a hole was put down under the conditions set forth in the accompanying illustration. The hole was of such size as to take a 6-in. casing, but the casing was only carried down a slight distance. When the cavity was reached, the casing was capped until the measurements could be made. The results are shown on the accompanying diagram. The percentages of gas refer to the sum of all other gases than air; while not all explosive, they are at

least foreign to the normal mine atmosphere. Unfortunately some minor changes were being made in the mine ventilation during the period of the observations, which would affect both water gage and velocity.

The mine is ventilated with a force fan delivering 175,000 cu.ft. per minute at a water gage of 3.4 inches.

The water gage at the hole when opened was 2.7 in., which was apparently too high, but when the specific gravity of the mixture (about 0.6) is taken into consideration, this discrepancy was explained. It was found that when the hole was first opened it delivered 154 cu.ft. per minute; as the percentage of gas fell off, the water gage became less until the normal pressure was reached (1.8 in.), the volume suffering a corresponding drop to 68 cu.ft. per minute.

At first the atmosphere that came off was nearly all gas, but this dropped rapidly in percentage till the end of the fourth day. Thereafter the percentage and quantity of gas remained constant. It would appear that as the quantity of gas no longer varies, the amount leaving the borehole would be an index to the gas actually formed, which is computed at about 12 cu.ft. per minute.

The area of the base of the gob was measured as 92,400 sq.ft., and the coal being 8 ft. high, would give a volume for the accumulation of gas about 739,200 cu.ft. The observations indicate that the hole gave off in the first four

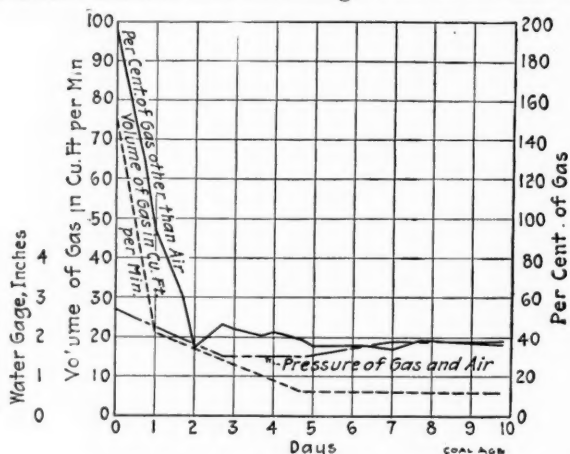


DIAGRAM SHOWING VOLUME, PRESSURE AND PER CENT. OF GAS FROM BORE HOLE

days approximately 245,000 cu.ft. of gas. The mixture of gas and air was not uniform, but the average of the mixture was equivalent to about 25 per cent. gas.

Complete analyses of the gas were not continuously made, but an analysis of the sample taken 24 hours after the hole was opened showed as follows:

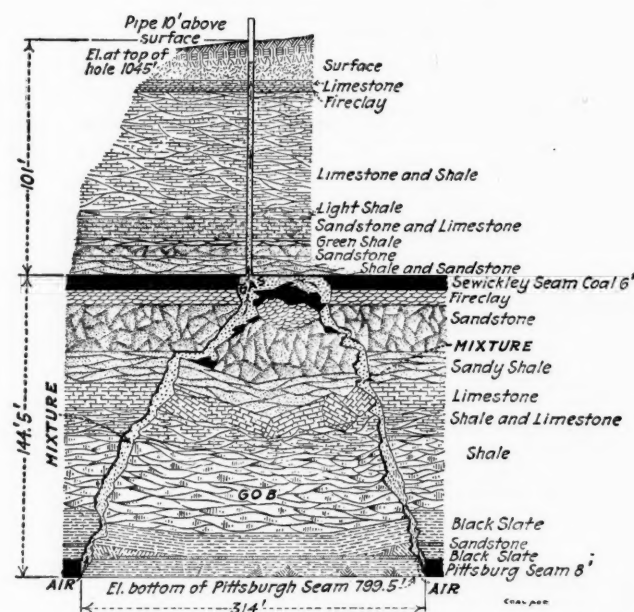
CO <sub>2</sub>	=	1.00	} Air
O	=	11.66	
N	=	44.30	
N	=	10.52	
CH <sub>4</sub>	=	32.52	
100.00			

The peculiarities of this analysis are the low percentage of carbon dioxide (CO<sub>2</sub>) and the large percentage of nitrogen other than that normally in air. This indicates that the "gases other than air" consisted of 27 per cent. "blackdamp" and 73 per cent. "firedamp."

Among various unknown factors was the inclination of the fracture line above the coal. The hole demonstrated that this angle was less than 45 deg., but it could not be determined how much less. It is probable that the hole is located at or very near the highest point in the cav-

ity. The question as to what the pressure or water gage would be, could, of course, not be determined, and on this depended the success of the experiment. Pressure varying as the square of the volume, it is evident that with a very small pressure, sufficient volume could not be delivered. This again would depend on the quantity of gas given off. Fortunately, even with the unprepared and incomplete observations taken, all of these facts were sufficiently determined to give quite an accurate approximation of what will exist under other conditions.

The object to be attained in this or other cases of gas accumulation is to have a hole of sufficient size with sufficient pressure behind it, so that the mixture coming out of the hole will be below the explosive limit. In this case, we find that a pressure of 1.8 in. and a 6-in. hole accomplished this when the quantity of gas liberated did not exceed 12 cu.ft. per minute. Should a locality show that it is producing more than this amount, the problem can be solved by increasing the water gage of the fan.



PROBABLE CONDITION OF ROOF FALLS AND LOCATION OF HOLE IN RELATION TO COAL PILLARS

This could be done by putting a regulator in the return and then increasing the water gage until there was sufficient pressure on the hole.

In the case of a disk-type fan where the water gage is rarely over 0.6 in., there would be only one remedy and that would be to put a small ventilator on the top of the hole and exhaust the air. All this presupposes that the mining fan delivers a force current. It is probable that in the case of an exhaust fan, the scheme would not work at all. In fact, there might be a reversal of the current in the hole, due to the specific gravity of the gas.

In using this method of ventilating gobs, several precautions should be taken. There should be no fire near the hole when it is drilled in. While at first the gas would only burn at the top of the hole, later, as the mixture had more air, it would sometime come to the explosive point and the explosion would run down and ignite any explosive mixture which might be in the gob. After the hole is drilled in, the casing should be extended 10 or 15 ft. above the surface to avoid accidental ignition.



## Editorials

### Purchased Power

Elsewhere in this issue we print a somewhat lengthy article on the subject of "Purchased Power in Bituminous Coal Mining," which sets forth the numerous advantages, real and imaginary, of this source of power supply.

While we would be inclined to agree with much of the text and sentiment of this article, there is also much to which strong exceptions might be taken. We would call particular attention to the following statements:

Many operators know that electricity applied to their workings would increase the output. It is, however, expensive to install a generating plant and equip a mine for electrical operation.

An operation now using steam power and mule haulage can change to electric power at a minimum of expense if current is purchased from a power company. By so doing the greatest item of expense (the power plant) is eliminated.

The general situation confronting the coal producers is such that in the future many of them must take advantage of purchased power. It is the one means of meeting the condition.

If central-station power will be a means to increase the tonnage, reduce production cost, and allow extensions to be made at a minimum of expense, surely the operators will want it.

Gasoline locomotives are being tried out for mine haulage, but so far have met with indifferent success.

It is not an uncommon thing when investigating conditions at a mine with an isolated plant to find that the power generated per ton of output is as high as 12 to 14 kw.-hr. with the corresponding cost running from 15c. to 25c. per ton. With the intelligent use of purchased power the consumption should not average higher than 2 to 5 kw.-hr. per ton, and the total cost for power should not run above 3c. to 7c. per ton of output.

From the business standpoint, what does it matter whether a man pays a certain amount from his own pocket for a power plant, or pays interest, depreciation, insurance and taxes on an equal investment made by someone else? Let no coal operator contemplating the purchase of power deceive himself or allow himself to be deluded into the belief that by buying current he escapes an investment in power-generating apparatus. For, while it may be true that he is not called upon to immediately pay down a lump sum for a power plant, yet he nevertheless pays all the overhead and operating charges—and usually a plump profit also—on somebody else's investment. These items are about as unavoidable economically as the law of gravitation is physically.

While the central power station furnishing current to coal mines undoubtedly fills an economic need in the fuel-producing industry, it is by no means a panacea for all the ills with which the industry is beset. Even though possibly many small operations may be able to buy current at a less cost than that for which they could generate it, there is no legitimate excuse for crediting purchased power with economies which, of right, belong solely to electrical distribution.

The writer of the article calls attention to the excessive cost of power in small steam-operated plants, and states that 12 to 14 kw.-hr. are often expended per ton of coal mined, with a cost of from 15 to 25 cents, which

"with the intelligent use of purchased power," might be reduced to not more than 2 to 5 kw.-hr., costing not to exceed 3 to 7 cents.

When we consider that in not a few mining plants of even moderate capacity, throughout the country, current may be generated and delivered to the outgoing busbars at a cost of from 0.6 of a cent to 1 cent per kw.-hr., it might be pertinent to ask what might be accomplished at mines, such as the writer has mentioned, by the *intelligent* generation and distribution of homemade current?

The writer's remarks on the gasoline locomotive need no comment. Most of our readers are well acquainted with the status, success, possibilities and limitations of this type of motor.

The circumstance wherein the isolated mining station appears to be the most vulnerable is that not in one case in ten are the cost facts known—not one operator in ten knowing with certainty what the power he makes costs or should cost.

Had the numerous mining plants which are now giving way to central station power been properly designed, well built, efficiently maintained and operated, it is extremely doubtful if purchased current could compete with them as easily and as advantageously as is now the case.

§

### The Ethics of Unionism

We are unwilling to believe that a union with a straightforward moral code is impossible. The majority of the workmen, we are sure, are prepared to do what conscience dictates. Consequently, we believe that if the papers of the country generally would insist that employers and employees alike should be honest in their dealings with each other a great change for the better would come over our industrial disputes.

The press has done a great deal to elevate the employer, to make him more amenable to conscience and public opinion. It is certainly time that something was done to make the employee also believe that he is not justified in doing anything and everything which the law does not forbid. A code of ethics is much needed for unionism.

The trouble in Vancouver Island is a case in point. The miners of the Cumberland and Extension collieries operated by the Canadian Collieries (Dunsmuir) Ltd., were discontented over the dismissal of two men and struck. The Industrial Disputes Investigation Act provides that, before striking, the miners or other employees shall submit their grievances to an impartial board of three members, the company and workmen each having a representative on the board. The law does not compel acceptance of the finding of this arbitration commission but it does forbid strikes and lockouts pending the inquiry.

So the miners, to evade this reasonable provision, decided to go on a "holiday" and not on a strike. This was on Sept. 16, 1912. As the United Mine Workers of America has subsidized this violation of the law by

paying strike dues to the holiday makers, the miners at the Cumberland and Extension mines are still continuing their festive idleness.

It was found necessary later to extend the strike and Frank Farrington, at Seattle, Wash., under orders, he says, of John P. White, ordered a strike, in violation of the law, at all the other mines on Vancouver Island. We quote his words because they justify the statement that President White is not sincere in trying to keep the union on a truly honorable basis.

Therefore, using the authority given me by President White, and in order that we may combat solidarity with solidarity, I hereby instruct you to call a strike of all the men employed in and around all the mines at Nanaimo, South Wellington, and Jingle Pot, the strike to begin May 1 and to continue until a joint working agreement between the United Mine Workers of District 28, and the mine owners on Vancouver Island has been secured; said agreement to carry increased prices of labor and improved conditions of employment. You will also make a diligent effort to secure the names of all men who refuse to respond to the call to strike so that they may be published throughout Canada, Great Britain and the United States.

So these men were to be forced whether they would or not to leave their work without any ballot to express the popular will. White, of Indianapolis, says so, Farrington, of Illinois, approves, Foster, of Nanaimo, also assents and what rights have any of these miners or a majority of them in convention assembled to act counter to their declared will?

A meeting was held by the union at Nanaimo and several officers of the United Mine Workers of America addressed it. Foster, the district president, said "there was no need for a vote on the strike which was called by 2000 workers and now on." The report of the Royal Commissioner, which is the basis for these remarks, goes on to state.

There was much dissent during the meeting, but those who urged the keeping of their existing agreements were shouted down. When the chairman was asked why the men were not allowed to vote on the question, the answer was that they should join the organization and get a vote.

Meetings were called for a ballot but all kinds of intimidation and disorder were employed. Meantime Foster issued red posters stating "Ballot or no ballot, anyone going to work at these mines will be branded as a scab." Finally the ballot was taken and out of about 2000 men only 478 were present to vote. Of these 432 voted to continue working but they ultimately decided not to go to work owing to the smallness of the vote.

Quibbling, blackmailing, intimidation and despotic methods mark the action of the union at Nanaimo. Since May 1, 1913, the strike or "holiday" has continued over the whole island though the mines are by no means idle. Meanwhile, the men denied a voice, forbidden to keep their contracts, prohibited from obeying the law are being displaced, we fear permanently, by strike breakers from everywhere, including natives of China and Japan.

### Making Men

Anyone who has seen the way in which rooms without sights drift helplessly right and left, will soon realize how hopeless it is for us to do work cheaply with the miners now found in our mines. It would be comparatively easy, if our miners were trained, to lay out heading rails in an absolutely true line in plan and then angle off the first straight rails at a given angle from these by the use of a template, and keep the line thus obtained

without variation. At least this could be done in a level, or nearly level mine. But instead of this we drive rooms, if sights are not used, so that they "doghole" into one another every 75 or 100 ft. Trained miners are certainly badly needed.

In the track-laying of rooms the poorest of work is usually done, and the delays in gathering and hauling largely arise from the derailments in rooms. It is idle to say that many miners do better and know better than our words indicate. It may be readily granted that this is so, but the first man to put a wrong course or kink in his room has made trouble all along the line.

The coal of the man who has used excellent discretion is taken by his neighbor whose work is bad, and the competent miner must turn to the right or left, or drive a room without a pillar, and his track must twist from side to side, if he would follow the vagaries of his room.

There is today but little pride in heading and room driving. We have seen work fifty years old which was driven without sights and which is far more perfect than some sighted work done today. No one can deny that the loss of coal is largely due to negligent and inexpert work on the part of about 50 per cent. of the miners engaged. Part is due to the obsolete methods of operators, but more is due to the inefficiency of the man at the working face.

It is time to rectify this condition. It is better, we think, to train 90 per cent. of the men in their work, that is the miners, than to expend all our efforts on about 5 per cent.—the would-be foremen.

The old miner was a proud man. He had a trade and knew he had learned it. There was a degree of satisfaction in his labors, such as an artisan always feels. But now there is no art of mining—merely a labor—and in unsighted mines the surveyor is hard put to it sometimes to tell just where he is.

■

### The Coming Spring Agreement

The condition of the United Mine Workers of America is not remarkably flourishing. A surplus of \$278,032.30 on Nov. 30 of last year, reduced by the large expenses of the recent session, is not a war fund on which much reliance can be placed. It amounts to hardly a dollar for each member in the *bituminous* regions.

The paid membership also declined noticeably since August, 1913, when it was 409,154. In November, it was 374,358. However, the membership fluctuates so widely that too much emphasis should not be placed on this fact. It is permissible, however, to call attention to the official statement that in November, 1913, the paid membership was smaller than on the same date in 1912 by 12,607 members.

These facts do not bode well for a sturdy resistance this spring. Seeing, however, that some leaders prefer a penniless union, and look upon a reserve fund as an evidence of a base concession to the power of capital, we cannot anticipate that there will not be a bitter struggle for further concessions. The bituminous mine workers cannot fight like those in the anthracite region, for they have only the earnings of 100,000 anthracite workers on which to rely. On the other hand, a strike of the anthracite miners involving only one-third as many men might receive three times as much pecuniary support as one involving all the bituminous mines.

## Legal Department

### Must a Contract to Sell Coal Be in Writing?

BY A. L. H. STREET\*

**SYNOPSIS**—By statute in most states agreements for sale must be evidenced by signed writings, if the price exceeds a fixed amount, if no part of the price is paid, and if no part of the property sold is accepted and received by the buyer. What the courts have held in coal-trade cases.

To minimize opportunity for fraud and misunderstanding in commercial transactions, most of the states have enacted a law which provides, in effect, that no contract to sell personal property at a price of \$50 or more shall be valid, unless the buyer accepts and actually receives part of the goods, or makes a payment on the price, or unless the contract or some note or memorandum thereof is reduced to writing, and signed by the person to be bound thereby. I understand that this law is not in force in Louisiana, and one or two other states may prove exceptions to it, but, otherwise, it is uniformly operative throughout the country. In a few states, however, oral contracts of sale, involving \$30 or more, are governed by this law, which is technically known as the "Statute of Frauds."

To meet the requirements of the statute, it is not necessary that a formal contract be entered into; a memorandum, however, informally written, is sufficient if it discloses the terms of sale. Thus a letter, telegram or receipt may be an adequate memorandum, and a signed offer binds the person who makes it. To satisfy the law, a contract to sell coal must afford means of definitely ascertaining the quantity to be delivered and the price to be paid.

#### A COAL CONTRACT WHICH WAS DECLARED VOID

Applying the requirement of the Virginia Statute of Frauds that the writing must be signed, the United States Circuit Court of Appeals held, in the case of Richmond Standard Steel Spike & Iron Co. vs. Chesterfield Coal Co., 160 Federal Reporter 832, that a purported contract to sell coal to which was subscribed the seller's name in typewriting, with an unfilled blank under it for the signature of the officer of the selling company who was to sign it, was insufficiently signed, although the company retained the paper after its delivery by the buyer, and although partial deliveries were made according to the terms of the writing. The court decided, however, that the typewritten signature would have been sufficient had the selling company authorized the appending of it to the writing, or adopted it as a signature.

Payment of part of the price, or an amount to bind the bargain, avoids necessity for evidencing the contract by any writing, although good business practice

would seem to require the terms of every contract to be in "black and white." The payment must be actual, however, and not simulated. Delivery of a check drawn against ample funds in a bank is equivalent to payment in cash, but execution of a note is not.

To satisfy the clause of the law which avoids the necessity of a writing where the buyer accepts part of the coal contracted for, the coal must pass completely under his control. But it is not essential that, at the time of such acceptance, the coal be measured to determine the amount due on its price.

#### A NEW YORK CASE CITED

And, according to the decision of the New York Court of Appeals, in the case of Thedford vs. Herbert, 87 Northeastern Reporter 798, a partial delivery of coal, made after the contract was entered into, renders the agreement of sale valid although the contract was verbal. In this case, it appeared that, after the terms of the sale were orally agreed upon, the seller requested the buyer to confirm the agreement in writing, which the buyer did, stating the price and other terms. Part of the coal was then delivered and paid for. The Court of Appeals rested its opinion as to the validity of the contract on the fact that a partial delivery was accepted by the buyer in recognition of the agreement.

The courts have been frequently called upon to decide that mere delivery of a commodity does not take a contract for its sale outside the Statute of Frauds. It must appear that the delivery was "accepted" by the buyer or by his authorized agent. Thus mere delivery of coal to a carrier does not constitute an acceptance by the buyer, unless he authorized the carrier to make a final acceptance for him. Nor does the fact that coal is otherwise delivered at the place for delivery fixed by the agreement show, of itself, that the coal passed under the control of the buyer.

In addition to contracts for the sale of commodities, the Statute of Frauds usually provides that no promise to discharge the obligation of a third person, and no contract which is not to be performed within a year from its making, and no agreement to grant an interest in land, excepting leases for not more than one year, shall be valid unless it is evidenced in a writing, signed by the person to be bound thereby. Accordingly, the Missouri Supreme Court decided in the case of Reigert vs. Manufacturers' Coal and Coke Co., 117 Southwestern Reporter 61, that a contract for services in working up a market for the company's products was invalid where it was not reduced to writing and was not to expire within a year.

**Fraud in Performance of Public Contract**—Where a prison coal contractor delivers as pea coal an inferior grade worth \$1 a ton less, he renders himself liable to the state in damages on the ground of fraud, although the prison authorities may have been derelict in duty in failing to discover the deficiency in quality. (New York Court of Appeals, *People vs. O'Brien*, 103 Northeastern Reporter 710.)

\*Attorney-at-law, St. Paul, Minn.



## Sociological Department

### More Club Rooms for Mine Workers

The building of five new "mess houses" at as many collieries has been authorized by the officials of the Lehigh Valley Coal Co. They will be of a standard design, based on that of the mess house built experimentally at the Prospect colliery of this company, and their size will depend upon the number of men working at the various operations.

The collieries at which these mess houses, where the men can gather to have their midday meal in comfort, instead of eating in the breaker or in the boiler and engine rooms, are the Franklin, Packer No. 5, Derringer, Park and Buck Mountain. Their construction will be started shortly.

The floors, walls and ceilings of the new mess houses will be of cement, so that they may be easily kept clean and sanitary. They will contain coat and locker rooms, a wash room with hot and cold running water and enameled basins, and a lavatory. The meeting and lunch rooms will be well lighted and heated and will contain benches, tables and simple cooking conveniences.

The mess house at the Prospect colliery has proved extremely popular, especially in the colder months. A number of the mine workers formed a "coffee club," the members of which take turns in heating coffee for the crowd on the simple appliances provided for that purpose, and some of the men bring clean clothes and take a complete bath at the mess house after finishing their work each day.

It is understood that, if these additional houses meet with the same success as that at the Prospect colliery, the system will be gradually extended to all the Lehigh Valley Coal Co.'s operations. Each house is in charge of a man employed to keep it clean and in order, and the mine workers themselves, at the Prospect colliery, have shown their appreciation by refraining from damaging the house or abusing the privileges.

### Concrete Vaults in Colliery Villages

BY A PENNSYLVANIA MINING ENGINEER

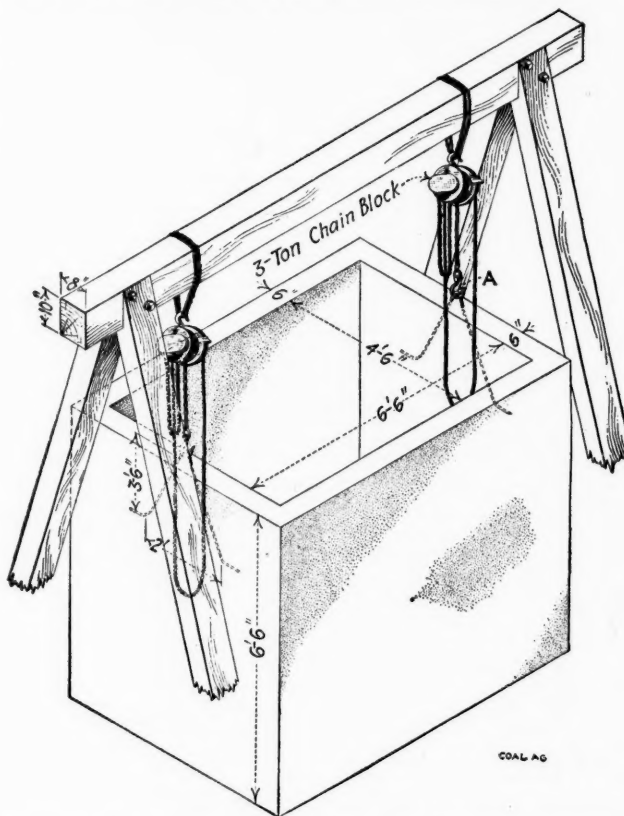
Sanitation is as important as safety, but it is more generally neglected. One of the most important things about sanitation is the construction of closets of a character which will not serve to spread disease. Some few years ago, we used to see them located over streams and the vaults were usually constructed of rough boards of all widths, lengths and thicknesses; anything was considered good enough for a privy.

#### DIFFICULTIES WHERE WATER IS ENCOUNTERED

Vaults are now built of concrete and when the excavation is made in dry soil, their construction is comparatively easy. We use old boards to make an inner

form and allow the excavation to serve for the outer. When we encounter soil which makes water freely, we must resort to some other method of placing it.

We excavate the pit somewhat larger on all sides than the vault we desire to construct. Substantial timbers measuring 8x12 in. make a good support and these are laid over the hole and a double form is built on them. This is built as nearly water-tight as possible. The timber used is of good quality, for forms should never be built of poor material. Concrete is deposited in these forms and allowed to set for five days. It should then receive two coats of good paint, both inside and out.



METHOD OF LOWERING WATERPROOFED CONCRETE VAULT INTO PIT SUNK IN WATER-BEARING STRATA

A vault of good size should be 4 ft. 6 in. wide, 6 ft. 6 in. long, and 6 ft. deep, and 6 in. of concrete on the sides and bottom will make a sufficient lining. These dimensions, therefore, fix the size of the form and the excavation.

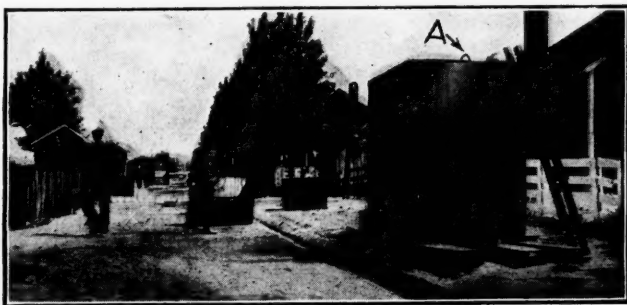
#### LOWERING THE VAULT INTO PLACE

The vault when completed should be lowered into the pit by means of a horse, which can be built of a piece of 8x10-in. timber, with four 6x8-in. legs. From this can be suspended a 2- to 3-ton chain block. Two men and a helper can easily lower the vault into place.

In order to make the vault water-tight, one quart of crude oil can be added for each sack of cement. The

mixture may be made, 1 part cement, 3 parts sand, and 5 parts stone. Good cement should be used, our practice being to use Universal Portland. Bluestone we find preferable to other stone although slag will give good results.

It will be noted on the top of the vault in the picture that there is a loop of  $\frac{7}{8}$ -in. haulage rope A which passes down into the concrete about 3 ft. 6 in. The rope utilized, may have served its appointed time in the mines, and, if so, the grease must be thoroughly burned off it.



AN ALLEY OF A MODEL MINE VILLAGE. CONCRETE VAULT READY FOR LOWERING IN PIT PREPARED FOR ITS RECEPTION

Two loops are placed on the top of the vault and by this it is lowered into the pit.

#### CONSTRUCTION COSTS

A vault such as that described can be built for \$36 complete, the price covering both labor and material. But to keep the price within those limits, 15 must be constructed and it does not pay to build less than ten, as the forms and horse are expensive unless used for the construction of several vaults.

#### Restoratives

One of the many uses of aromatic spirits of ammonia is to restore persons overcome by asphyxiation, drowning or electric or traumatic shocks. As usually applied there is a considerable doubt as to its effect. The ammonia soon loses strength when exposed to the air; on the other hand, it may be strong and be used without discretion. It is true that an unconscious man is not likely to inhale heavily on the contents of the bottle or rag with which it is administered but he may easily receive too strong a dose. Furthermore, the contents of the bottle may be spilled on the patient, burning him severely.

To avoid these difficulties the Red Cross Society is offering for sale little vials containing the right quantity of aromatic spirits hermetically sealed. The vials are completely swathed in absorbent cotton so that they can be broken in the fingers without the edges of the glass cutting the finger tips. The glass is so fragile that it will yield and break when squeezed strongly and the liquid which escapes has the requisite restorative power. The vials are made in England where the idea of using them appears to have originated. They are termed "vaporoles." The cotton itself is kept in place by a thin netting of silk which prevents the vial from escaping from its cotton coat.

While the inhalation of ammonia from "vaporoles" or otherwise undoubtedly does good, the best way to administer aromatic spirits of ammonia if the maximum effect

is desired is to give it through the mouth in water. This method is, of course, impracticable with an unconscious patient. The "vaporoles" are especially serviceable in cases of threatened falling or syncope.

#### Vineyards and Orchards in Pocahontas Region

Several families in the Pocahontas region are setting out vineyards and orchards on plots which they have rented for a nominal sum. Some of these are three or four years old and are therefore in bearing condition. Scores of others have been set out within the past year and, of course, these will not be harvested for a couple of years yet. The majority of the white miners in this region come from Italy and Hungary and were agriculturalists in their native lands.

At Elkhorn and Crozer one can see on the sides of the hills, patches of ground fenced in, filled with neatly pruned and securely trellised grape vines. On other spots there are peach, apple, pear and other fruit trees regularly laid out. Most of the grape vines have been imported from the countries whence the miners came.

But tilling the soil is not confined to the whites. Hundreds of negro miners of the Pocahontas coal fields devote their energy to gardening. Far up on the tops of the mountain where the land is comparatively level, the negro miners raise vegetables such as they formerly grew in old Virginia, North Carolina and other Southern states. They are not much given to fruit raising. They do not even raise many watermelons, but prefer cabbages, potatoes, beans and the like. By this soil tilling, in their leisure hours, the miners in the Pocahontas field have materially reduced the cost of living and are increasing their savings accordingly.

#### Work of Rescue Car in Arkansas

Mine rescue car No. 4 of the U. S. Bureau of Mines was for a long time engaged in Arkansas in giving training and instruction to the miners of that field in the work of mine rescue and first aid to the injured. The work at Russellville completed the training itinerary of car No. 4 through Arkansas, which began on Oct. 15 (being interrupted for ten days by the trip to the mine disaster at Dawson, New Mexico) and on January 7 the car returned to headquarters at Pittsburg, Kansas. During this trip through Arkansas the coal camps were visited in the following order—Hackett, Midland, Hartford, Greenwood, Jenny Lind, Huntington, Paris, Denning and Russellville.

A total of 150 miners were given the full week's course of training in mine-rescue work, first aid to the injured, the use and care of safety lamps and safety appliances, and other instruction pertinent to the conservation of life in the coal mines; also 5000 miners and others attended lectures on the car. The spirit and enthusiasm with which the miners and operators entered into this training work speaks well for the future of the coal-mining industry in the state of Arkansas. State Mine Inspector Tom Shaw also worked with untiring energy to make this training work a permanent factor in furthering the safety of mining conditions in Arkansas.

H. D. Mason, Jr., in charge of the mine-rescue car has the following to say with regard to this training work, "I wish to thank the miners, operators, mine inspector, and railroads of Arkansas in behalf of the U. S. Bureau of Mines for their constant courtesies and most sincere interest in this work for the conservation of human life in the coal mines. Never has it been our pleasure to meet brighter and more clever mining men; than those with whom we have been associated during our work through Arkansas, and Doctor Chisholm and myself will leave this state feeling that the work already accomplished will be carried forward by the men at the mines."

## Discussion By Readers

### Rope Lubrication

*Letter No. 1*—I have read the query on the matter of rope lubrication, by Superintendent, asking for the records and results of scientific investigation and the practical experience of mining men, in reference to the lubrication of cables with a view to the prolongation of the life of the rope. I note that the editorial comment, in reply to this inquiry, advises, first, the application of linseed oil, COAL AGE, Jan. 17, p. 139. In this connection, I want to draw attention to a few quotations bearing on this question.

In opposition to the use of linseed oil as a lubricant, Redwood says: "Neither raw nor boiled linseed oil must be used as a lubricant, as they quickly oxidize."

Victor Schweitzer, in *The Distillation of Resins*, p. 155, says: "The thickening of linseed oil results from the absorption of oxygen in the air."

Another investigator of world-wide reputation, found that linseed oil in the presence of moisture and gases, in the New York subway, was converted into a soap and, in this form, served as a carrier of moisture to the metal that it was designed to protect, causing its corrosion.

In the proceedings of the tenth annual meeting of the American Society for Testing Materials, Charles B. Dudley, president of the society at that time, said, in discussing this subject: "If you can so cover your metal that you keep the oxygen out, there will be no corrosion."

I may add, the same argument applies in regard to the use of pine tar as a protective against corrosion. In its hardening process, it also absorbs oxygen from the air. The lime used in neutralizing any acid it may contain is attacked by the chemical action of gases and mine waters, the hydrogen sulphide of acid mine waters converting part of the lime into calcium hyposulphide, and the carbon dioxide of the air and mine water, converting another portion of the lime into calcium carbonate. The former lime salt, in the presence of moisture, again gives up the hydrogen sulphide, which gas attacks the metal, causing its corrosion.

Any mixture of linseed oil and pine tar would possess the combined faults of both of these constituents. The only virtue of such application lies in their great adhesiveness. A prime factor in securing immunity from corrosion in rope practice is the elimination of all oxidizing influences; but this is, in present-day knowledge, a costly operation.

A. C. STALKNECHT.

Pittsburgh, Penn.

[Our correspondent has given some valuable quotations, in connection with the lubrication of hoisting and haulage ropes. These quotations must be taken for what they are worth. The first quotation, from Redwood, undoubtedly refers to the use of boiled linseed oil for lubricating machinery. While there is no doubt of the absorption of oxygen by oils and tars, in the hardening process, there is some question of the conveyance of this oxygen to the iron or steel protected by said lubricant.

The chemical action of gases and acid mine waters on these lubricants destroys, undoubtedly, in time, their protective qualities, but, the question may properly be asked, will not these agents attack the unprotected iron or steel more rapidly than when compelled to act through the protective coverings. The present-day practice of manufacturers and users of wire ropes is as stated in the editorial comment to which reference has been made, COAL AGE, Jan. 17, p. 139. We would suggest that our correspondent, after his severe arraignment of this common practice, should give the readers of COAL AGE a substitute for the applications he condemns.—ED.]

### Fan Ventilation

In reading the answer to D. J. Hopkins' question on Fan Ventilation, COAL AGE, Jan. 24, p. 180, permit me to say that I think the way this question is answered may prove to be misleading. It might cause a company to install a fan and, perhaps, fail then to obtain the necessary quantity of air, owing to certain existing conditions in the air courses, which are often very contracted in thin seams, frequently having a sectional area of only 30 sq.ft.

I would like to suggest another question: Assuming the conditions stated by Mr. Hopkins and assuming, further, that both openings have practically the same elevation and that the distance from the present fan to the back opening in the mine is  $1\frac{3}{4}$  miles, suppose that a 6-ft. Stine fan is now installed at the back entrance, capable of producing 20,000 cu.ft. of air per min. against a 1-in. water gage; how much would this second fan increase the quantity of air in circulation in the mine? Assume, for example, that the present circulation of air is 80,000 cu.ft. per min. against a water gage of 3.5 in., and that this circulation is produced by a 12-ft. fan; and that the resistance of the return airway is equivalent to a  $1\frac{1}{2}$ -in. water gage.

CONSTANT READER.

Punxsutawney, Penn.

Our correspondent has assumed conditions not involved or suggested in the previous question. Mr. Hopkins' question simply asked if the installation of a second fan, working in parallel with the first, would prove satisfactory; or, as he says, "will both of these fans work successfully?"

There is no question but that, before making such installation, every effort should be made to increase the circulation in the mine by clearing up the air courses, enlarging breakthroughs and shortening the distance the air must travel wherever this is practicable. The question of the airways being driven in a thin vein and having a small sectional area, does not affect the principle involved in the answer to this question. The principle, in respect to both fans working successfully, will be the same whatever the sectional area of the airways.

Referring to the question proposed by correspondent; namely, the installation of a second fan, located at a back opening in the mine (not mentioned in Mr. Hopkins'



question), this suggestion is extremely doubtful and would only prove advantageous to the extent the distance of air travel is shortened and under certain conditions in which the air current, at some point in the mine, has virtually lost its velocity, becoming dispersed in the workings. The second fan, under such conditions, will act as a booster. We could not attempt to give an answer to the question, how much this fan would increase the present circulation of 80,000 cu.ft. of air per min., under the conditions stated, as we regard this wholly incalculable.

### The Certificate Law

*Letter No. 16*—In the discussion of the certificate law, several correspondents seem to think that all mine foremen and firebosses should be examined every few years. While I feel that a superintendent or foreman of a mine should possess a certificate of competency, I do not concur in the opinion that these officials should pass an examination so frequently. I would ask why a mining man should be required to stand such frequent examination in order that he may follow his vocation when this is not done in other professions. Would it not be just as necessary to require that state certificates, diplomas and licenses should be subject to a reexamination, in all callings and professions?

The ability to pass an examination does not make a man a successful mine foreman. One correspondent who favors such frequent examination, himself admits knowing a foreman of a gaseous mine, who has no knowledge of gas. If this man was required to pass another examination, would he not probably secure a certificate by the same unfair means he employed to get the first? Again, other candidates who are thoroughly posted on the theory of mining and could pass any examination without a day's preparation, lack executive ability in the handling of men so essential in the operation of a mine.

The mine foreman who is faithful and devoted to his work is learning every day by experience. He is constantly confronted by practical problems in ventilation, haulage, drainage, timbering, methods of mining, etc., that he must master. Ask one of these men who has been "on the job" for several years, how much more he knows now than when he obtained his certificate, and he will tell you that he knew nothing about mining then, in comparison with what he knows now, which shows that he has acquired a vast amount of knowledge in the school of experience.

My opinion is that every mine foreman should be progressive enough to keep abreast of the times by reading books and journals devoted to mining. It is only too true, however, that through the extra work required in the mine and the conferences with the superintendent every evening, after supper, in the office, the mine foreman has little time to himself that he can devote to study.

In the discussion of this question, it should be remembered that the mine foreman, like other men, has many duties demanding his attention a part of the time. He cannot neglect the duties he owes his family and the community in which he lives. Besides attending religious, fraternal, social and other meetings, he must have some time for recreation. When these numerous demands on his time are considered, it seems to me that, having passed one successful examination, the faithful mine foreman should be regarded as sufficiently qualified for the position he holds. I advise all whose time will

permit to continue to study and read and aspire to higher things. A man should qualify himself for something better than his present position, remembering that "there is always room at the top."

BITUMINOUS.

Windber, Penn.

*Letter No. 17*—The discussion of this subject, in the different letters submitted, has interested me very much and leads me to express my opinion in regard to the interchange of state certificates of competency.

I may say nearly one-half of my mining experience was gained in the Clearfield region of Pennsylvania, although I have had practical experience in 37 different mines located in six different counties in this state. While I am not in favor of an interchange of certificates between the different states, I fail to understand why anyone should argue that a man who has obtained his experience in the Clearfield region and has passed successfully the examination required for first-grade mine foreman certificate is not able to successfully manage mines in West Virginia, as stated by one correspondent, *Letter No. 5*, Vol. 4, p. 912. There are drift, slope and shaft mines in Clearfield County, and the characteristics of the coal seams are somewhat varied, there being gaseous and nongaseous mines in that region. I think, also, that Joseph Virgin will find the same varied conditions in the mines of West Virginia as exist in the Clearfield region of Pennsylvania.

I want to say that our knowledge of mining would be limited indeed if the experience of our ancestors had not been handed down to us, either in verbal or written form. It is the combined experience of this and preceding generations that has brought mining up to its present standard.

In regard to the character of the examinations asked in different states, a simple comparison of the questions asked candidates for mine foreman and fireboss certificates in the bituminous regions of Pennsylvania, during the past several years, with the questions asked in other states will convince anyone that a man who can pass the Pennsylvania examination and has had sufficient experience in the coal mines of this country is well able to take charge of any mine in any state. Notwithstanding this, however, I am not in favor of a certificate of any state being good in another state, because of the fact that there are many men holding certificates of competency who are clearly incompetent.

Speaking of examinations, I think that any citizen of moral character and temperate habits who has had at least five years' practical experience in the coal mines of this country, immediately preceding the examination, should be allowed to sit in an examination in any state, whether or not he be a resident of that state.

In regard to the life of a certificate, since there are a large number of men who neither study nor read mining books and papers after they have obtained their certificate of competency, and others who imagine that they know it all and have nothing further to learn, I am of the opinion that no certificate issued in any state should be good for a longer period than four years. I also believe that the standard of examination should be the same in all states and sufficiently high to secure the greatest efficiency.

BENJAMIN HARTILL.

Johnstown, Penn.

## Colorado Strike Investigation

I read with interest the article by A Constant Reader, COAL AGE, Jan. 3, p. 28, in which he quotes a part of the findings of the Federal Grand Jury, sitting at Pueblo, Colo., investigating the Colorado coal strike. I would like to ask, Why does he quote only that part of the findings that is favorable to the Union?

In the absence of any information to the contrary I take it for granted that this correspondent is a union man. I have no fault to find with him in this respect but would call his attention to the fact that in order to present his case in an intelligent manner to the jury of public opinion, he should state all the facts in the case, both for and against his cause.

Inasmuch as he has stated those findings of the jury that were favorable to the Union cause, I will not repeat them, but will mention those that were adverse to the Union. I will also say, in a spirit of fairness and justice, that correspondent did not state *all* of the findings of this jury that were favorable to his cause. For the benefit of those who wish to secure the entire report it may be stated that it was published in full in the *Denver Post* (Colo.), Dec. 2, 1913.

As this jury was composed of nine men holding union cards and nine men without such cards, the charge that

it was a fixed or biased jury could not be sustained, as these nine union men would not have brought in the indictments against the heads of the United Mine Workers of America that they did without sufficient evidence to sustain such a finding. The parts of the report not quoted by correspondent are as follows:

"The methods employed by the United Mine Workers are an insult to law-abiding citizens and conservative labor. The miners organization has brought experienced strike agitators into the state and have armed hundreds of irresponsible aliens, who have become a menace to the peace, prosperity and lives of our citizens. The Union has created an open insurrection in southern Colorado and its methods are repudiated by all fair minded organizations. The officers admit their inability to control the miners in the tent colonies they have armed."

"A promise to pay fines," says the report, "is about all that is necessary, in order to become a member of the United Mine Workers of America"; and adds, "The dues are used to support insurrection and lawlessness and, when necessary, to force their demands by intimidation and fear whenever strikes are called, with the result of injuring other trades and the entailment of hardships and privations on the people of the entire commonwealth."

J. E. SMITH.

Sunlight, Colo.

# Study Course in Coal Mining

BY J. T. BEARD

## The Coal Age Pocket Book

### ADDITION OF FRACTIONS

In order to add two or more fractions together, or, in other words, to find their sum, it is necessary to reduce them to equivalent fractions having the same fractional unit. That is to say, all the fractions must have the same common denominator. The sum of the numerators will then show the total number of fractional units and this sum written over the common denominator will be the required sum of the given fractions.

**Rule**—If the fractions have the same denominator add the numerators together and write their sum over the common denominator.

If the fractions have different denominators reduce them to equivalent fractions having a common denominator and add together the numerators of the fractions, writing their sum over the common denominator, as before.

**To Reduce Fractions to a Common Denominator**—Find the least common multiple of all the denominators for a common denominator. Then divide this common denominator by the denominator of each fraction, in turn, and multiply the numerator by the quotient obtained, for a new numerator and write this over the common denominator.

**Example**—Reduce the following fractions to a common denominator:  $\frac{1}{3}$ ,  $\frac{2}{5}$ ,  $\frac{3}{7}$ ,  $\frac{4}{14}$ , and find their sum.

**Solution**—First find the least common multiple of 3, 5, 7, 14, thus:

$$\begin{array}{r} 2) \quad 3 \quad 8 \quad 12 \quad 18 \\ 2) \quad 3 \quad 4 \quad 6 \quad 9 \\ 3) \quad 3 \quad 2 \quad 3 \quad 9 \\ \hline 1 \quad 2 \quad 1 \quad 3 \end{array}$$

$$2 \times 2 \times 3 \times 2 \times 3 = 72 \text{ least common multiple}$$

The equivalent fractions are then found as follows:

$$\begin{array}{ll} \frac{1}{3} \times \frac{72}{72} = \frac{24}{72} & \frac{7}{12} \times \frac{72}{72} = \frac{42}{72} \\ \frac{2}{5} \times \frac{72}{72} = \frac{28}{72} & \frac{13}{18} \times \frac{72}{72} = \frac{52}{72} \\ \frac{3}{7} \times \frac{72}{72} = \frac{36}{72} & \frac{4}{14} \times \frac{72}{72} = \frac{24}{72} \end{array}$$

The sum of these fractions is now found by adding the numerators together and writing their sum over the common denominator, thus:

$$\frac{24 + 45 + 42 + 52}{72} = \frac{163}{72} = 2 \frac{19}{72}$$

Therefore,  $\frac{1}{3} + \frac{2}{5} + \frac{3}{7} + \frac{4}{14} = 2 \frac{19}{72}$  Ans.

**Example**—Add together the following fractions:  $\frac{12}{7}$ ,  $\frac{3}{5}$ ,  $\frac{5}{14}$  and  $\frac{21}{35}$ .

**Solution**—The least common multiple of the denominators, 7, 5, 14, 35 is 280, which is, therefore, the common denominator of these fractions. Hence

$$\frac{480 + 105 + 100 + 192}{280} = \frac{877}{280} = 3 \frac{37}{280} \text{ Ans.}$$

## The Coal Age Pocket Book

### SUBTRACTION OF FRACTIONS

In order to subtract one fraction from another, the two fractions must have the same fractional unit, as explained in addition of fractions.

**Rule**—If the fractions have the same denominator subtract the less numerator from the greater and write the difference over the common denominator.

If the fractions have different denominators reduce them, as before, to equivalent fractions having a common denominator and proceed as above.

**Example**—From  $\frac{6}{7}$  subtract  $\frac{5}{9}$ .

**Solution**—Since 7 and 9 are prime to each other, the least common denominator, in this case, is  $7 \times 9 = 63$ ; and

$$\frac{54 - 35}{63} = \frac{19}{63}$$

Therefore,  $\frac{6}{7} - \frac{5}{9} = \frac{19}{63}$  Ans.

### MULTIPLICATION OF FRACTIONS

In the multiplication of fractions, the numerators are multiplied together to form a new numerator and, likewise, the denominators to form a new denominator; and the resulting fraction is then reduced to its lowest terms. The work is much simplified, however, by the process of cancellation, according to the following:

**Rule**—Express the multiplication in the form of a compound fraction, by writing the numerators of the several fractions above the line and the denominators below the line. Then cancel all factors common to both numerator and denominator, and write the product of the factors remaining in the numerator for a new numerator; and, likewise, the product of those remaining in the denominator for a new denominator.

**Example**—Find the product of the following fractions:  $\frac{14}{25} \times \frac{10}{21} \times \frac{5}{6} \times \frac{3}{2}$ .

**Solution**—

$$\frac{14}{25} \times \frac{10}{21} \times \frac{5}{6} \times \frac{3}{2} = \frac{1}{3}$$

Therefore,  $\frac{14}{25} \times \frac{10}{21} \times \frac{5}{6} \times \frac{3}{2} = \frac{1}{3}$  Ans.

### DIVISION OF FRACTIONS

The process of division is similar to that of multiplication. **Rule**—To divide one fraction by another, invert the divisor and proceed as in multiplication of fractions.

**Example**—Divide  $\frac{5}{6}$  by  $\frac{15}{24}$ .

**Solution**—

$$\frac{5}{6} \div \frac{15}{24} = \frac{5}{6} \times \frac{24}{15} = \frac{4}{3} = 1 \frac{1}{3} \text{ Ans.}$$

## Inquiries of General Interest

### Study Questions--Regulators

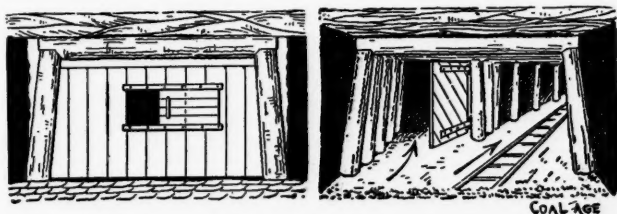
In studying some of the questions in the back numbers of COAL AGE, I find two that I would like to have further explained. One of these is in reference to calculating the necessary size of opening in regulators of different kinds.

In answer to the question, COAL AGE, Vol. 3, p. 502, asking for the size of the opening in a regulator necessary to reduce the volume of air in circulation to 15,000 cu.ft. per min., under a ventilating pressure of 6.954 lb. per sq.ft., it is assumed that the regulator is a "box regulator," and the size of the opening is found to be 5.35 sq.ft. I would like to ask how this question can be worked in the case of a door regulator.

X.

Heilwood, Penn.

The usual form of regulator is the box regulator, shown on the left of the accompanying figure. This is a brattice or partition erected in the airway and pro-



SHOWING "BOX" AND "DOOR" REGULATORS

vided with an opening having a small slide door, by which the size of the opening can be increased or decreased so as to regulate the flow of air according to the requirements.

In order to pass a given quantity of air through this regulator, under a given mine pressure, it is necessary to calculate, first, the frictional resistance of the airway and the unit pressure (lb. per sq.ft.), for the given quantity of air. Subtracting this from the given mine pressure, gives the pressure due to the regulator. This pressure is then reduced to inches of water gage and the value found substituted in the formula

$$A = \frac{0.0004 Q}{\sqrt{w.g.}}$$

In the case mentioned by correspondent, the original circulation is given as 60,000 cu.ft. of air passing under a pressure of 6.954 lb. per sq.ft. The natural pressure or the pressure due to friction when this volume is reduced to 15,000 cu.ft. per min. may be calculated from the original circulation. Since the pressure varies as the square of the quantity, the pressure ratio is equal to the square of the quantity ratio. Thus,

$$\frac{x}{6.954} = \left(\frac{15,000}{60,000}\right)^2 = \left(\frac{1}{4}\right)^2 = \frac{1}{16} = 0.0625$$

$$x = 6.954 \times 0.0625 = 0.434$$

The pressure due to the regulator is then 6.954 — 0.434 = 6.52 lb. per sq.ft.; and the corresponding water gage

is 6.52 ÷ 5.2 = 1.25 in. The required opening in the regulator is therefore

$$A = \frac{0.0004 \times 15,000}{\sqrt{1.25}} = \text{say } 5.35 \text{ sq.ft.}$$

It will be noticed that this question refers to a single airway only, in which it is desired to reduce the volume of air passing by introducing a regulator, which virtually has the effect of lengthening the airway. On the other hand, the use of a door regulator, as shown on the right of the figure, always assumes the splitting of the main air current between two airways, which may be of any size or length. The regulator door is placed at the intake end of the airways where the split is made.

In the solution of a question relating to a door regulator, it is necessary to know the volume and pressure of the main current and the length and sectional dimensions of the airway or split in which a given quantity of air is desired. It is then merely a question of swinging the door to one side or the other, so as to divide the sectional area of the main airway, so that the ratio of area for the split to the total main area will be the same as the ratio of the power in the split to the total power on the air. In other words, the power ratio between the split and the main airway is the same as the area ratio for these two currents.

Suppose, for example, the main intake airway in a mine is 6x10 ft., in which a current of 100,000 cu.ft. per min. is passing under a 2-in. water gage, or a mine pressure of 2 × 5.2 = 10.4 lb. per sq.ft. Keeping the power constant, it is desired to split the main current so that 40,000 cu.ft. will pass in one split 5x8 ft., 1000 ft. long. Find the area of opening for this split, using a door regulator.

**Solution**—The power on the air, in the main airway, at the point of split is

$$u_0 = Qp = 100,000 \times 10.4 = 1,040,000 \text{ ft.-lb. per min.}$$

The sectional area of the main airway is 6 × 10 = 60 sq.ft. The sectional area in the split is 5 × 8 = 40 sq.ft. The rubbing surface in the split is 2(5 + 8)1000 = 26,000 sq.ft. The velocity of the air in the split will be 40,000 ÷ 40 = 1000 ft. per min. The power on the air absorbed in the split is then

$$u_1 = ksv^3 = 0.00000002 \times 26,000 \times 1000^3 = 520,000 \text{ ft.-lb. per min.}$$

But, at the point of split, the height of the airway being constant (6 ft.), the area ratio for the split and the main airway, is the same as the ratio of the width of the opening ( $x$ ) for the split, to the entire width of the airway (10 ft.). Therefore, the width ratio is equal to the power ratio between the split and the main airway. Thus, in this case, opening leading to the split mentioned is

$$\frac{x}{10} = \frac{520,000}{1,040,000} = \frac{1}{2}$$

$$x = \frac{1}{2} \times 10 = 5 \text{ ft. wide.}$$



## Examination Questions

### Miscellaneous Questions

(Answered by Request)

**Ques.**—If you had charge of a mine ventilated by equal splits of air and the fan is running at its full capacity and providing efficient ventilation, how would you proceed to work this mine?

**Ans.**—If the fan is running at its full capacity and providing efficient ventilation in every section of the mine, the several air splits being equal, the further development and extension of the mine workings will depend on making some provision for an increased circulation of air, since it is impracticable to rob any of the splits and, also, impossible to increase the general circulation without increasing the capacity of the ventilating equipment.

Before doing this, however, a careful inspection of the mine should be made to see if the volume of air in circulation cannot be increased, by removing possible obstructions in the airways, or straightening the air courses, enlarging breakthroughs and reducing the distance the air must travel. The question of sinking another air shaft and changing the general plan of the circulation should also be carefully considered. If it is found impossible to increase the circulation in this manner the ventilating equipment must be improved or enlarged.

**Ques.**—Assuming a single entry and air course, each 4000 ft. long, ventilated under a  $\frac{1}{2}$ -in. water gage at the entrance; calculate the water gage that would be expected when these entries are extended 2000 ft.

**Ans.**—Assuming the power on the air remains constant, at the mouth of the mine, the ventilating pressure (pounds per square foot), and therefore the water gage, varies inversely as the quantity of air in circulation. But, for the same sectional dimensions of the airway and a constant power, the quantity of air in circulation varies inversely as the cube root of the length of the airway. Therefore, the unit pressure or the water gage, will vary directly as the cube root of the length of the airway. In other words, in this case, the entries being extended from 4000 to 6000 ft., the water-gage ratio is equal to the cube root of the length ratio; or, calling the required water gage  $x$

$$\frac{x}{0.5} = \sqrt[3]{\frac{6000}{4000}} = \sqrt[3]{\frac{3}{2}} = \sqrt[3]{1.5} = 1.14 +$$

$$x = 0.5 \times 1.14 = 0.57 \text{ in.}$$

**Ques.**—Assuming a pair of entries 4000 ft. long and a water gage of  $\frac{1}{2}$  in. at the mouth of the entries; calculate what the water gage should be at a distance of 2000 ft. from the entrance.

**Ans.**—Assuming a constant power on the air at the mouth of this pair of entries, the unit of ventilating pressure or the water gage varies inversely as the quantity of air in circulation, which, under the same conditions, varies inversely as the cube root of the length of airway, the resistance of which is measured by the water-gage reading. Therefore, the unit pressure or water gage varies directly as the cube root of the length of the air

travel. This, in the first case, is the double length of the heading (8000 ft.) and, in the second case, double the distance in by from the gage to the head of the entry (4000 ft.). The ratio will not be changed, however, by taking the single lengths of entries, 4000 in the first case and 2000 in the second case.

Therefore, since the water-gage ratio is equal to the cube root of the length ratio and calling the required water gage  $x$

$$\frac{x}{0.5} = \sqrt[3]{\frac{2000}{4000}} = \sqrt[3]{\frac{1}{2}} = \sqrt[3]{0.5} = 0.79 +$$

$$x = 0.5 \times 0.79 = \text{say } 0.40 \text{ in.}$$

**Ques.**—At a certain mine, at night, the fan running at 90 r.p.m. produces 100,000 cu.ft. of air per min. in the mine. In the morning, this fan, running at the same speed produces 125,000 cu.ft. of air per min., with no change in the circulation of air throughout the mine. What is the probable cause?

**Ans.**—Without a further knowledge of the conditions prevailing in this mine, night and morning, the general arrangement of the circulation and other data affecting the movement of the air, it would be impossible to more than speculate as to the possible cause of this large increase in circulation, in the morning. The reverse of this condition is more generally the case. However, it is possible to assume conditions that would very much retard the circulation of air, particularly in the early hours of the evening and the later hours of the day shift.

The operations of the mine produce greater or less quantities of smoke, dust and carbon dioxide. It is, moreover, possible that the temperature of the mine is somewhat higher in the evening than in the early morning hours. The smoke of shots at the close of the day shift may, under many conditions, be difficult to remove from the mine workings.

A higher temperature in the rise workings of a mine will generally produce a rise air column that will oppose, to a greater or less extent, the circulation of air in these workings; and likewise the presence of the heavier products of combustion in dip workings retards circulation and these gases are difficult to remove. It is very possible that such conditions as these, some or all of them, may operate to retard the general circulation of air in the mine, at the close of the day shift; while they would not exist to the same extent in the early morning hours when the mine workings are cooler and the air is clearer.

Another and more probable condition, however, arises from the habit of the miners, in many mines, of leaving their loaded cars of coal standing on the entries, in such a manner as to block the air. It is the duty of the night shift to haul these cars to the bottom of the shaft or to the parting, where the trips are made up ready for the morning. In each particular case, it would be necessary to make a careful study of the situation in order to ascertain the actual causes of the condition described. In the absence of exact information this can only be surmised.

## Book Reviews

**THIRTY-FIRST ANNUAL COAL REPORT OF ILLINOIS**, by the State Mining Board 1912, Martin Bolt, Chief Clerk, Springfield. xii+423 pp., 5¼x8¾ in. No ill. Cloth boards.

We think it is due to Martin Bolt and the Mining Board of Illinois to call attention to the excellent annual report they prepare. There are some state reports which are perfect models of "how not to do it" so we think we are justified in stating our approval of this Illinois volume. But, on the other hand, there are reports in other states, the methods of which are closely parallel those followed in this book.

The unit of this report is in general not the district, but the county. The latter division is one in which all are interested. No one knows anything about the inspectors' districts and they may have been changed once or more during the current year. They are always subject to relimitation at the will or the whim of the chief inspector or a mining board. No one will use the results for comparison, for nobody cares about an inspection district; the constant shifting of its boundaries and its purely artificial limits make it incapable of being the subject of sentimental attachment. As someone has said, "Peradventure a man might die for his home, he will never do it for his boarding house."

Divided by counties the Illinois book does not need an index for if the county is known, the desired information can be immediately obtained by turning to the figures and annotations for that particular county. If the town only is specified Rand, McNally or Hammond will supply the political division.

But one commonwealth in particular produces a report in which there is not even a convenient table in which the names of the counties comprehended in the various inspection districts can be found grouped conveniently together. As a result, in order to be sure that a complete search has been made the reader must look through nearly 1000 pages and endeavor to discover therefrom the numbers of the inspection districts in which all parts of a certain county may lie. Two indexes are now provided in that book to which we are taking exception, but one is useless; the other, an index of companies marks a considerable improvement, but should have been added long ago.

Another feature of the Illinois report is that the front page contains a directory of inspectors and that, at the very beginning, there is a summary of the report. The annual mining records of some states are entirely unsummarized and if the figures are to be culled several pages must be scanned. When we know how intelligent the compilers of such reports are, we wonder whether it is the force of an evil precedent, or a lack of clerical help, which keeps them so closely bound to an evil system.

But we cannot indorse all we see in the Illinois report. For instance, we do not like to see mining machines and motors classed alone under makers' names. The various machine and motor makers have many different types of construction, which vary more from one another than machines of the same type made by different firms. Machines should be classed as punchers, cutter bar, breast chain, adjustable turret chain, shortwall chain, longwall chain and Hess-type machines. To this should be added a statement showing whether the machines are pneumatically or electrically actuated. Motors should be classed as air, gasoline, steam, direct-current motors, storage motors, combination storage-and-current motors, crab and reel locomotives. The makers' names could be added if desired.

We believe that when a man is injured in a machine room the type of machine in use should be given, so that some relation might be established between danger and certain types of machines requiring a large amount of free room. We hope these types may rapidly become obsolete. We also believe that the manager of every mine should specify, as in the English collieries, how much permissible powder is used, even if he is not also required to declare what amount is used of each brand.

Finally we should express regret that the fiscal year of Illinois is not the same as the calendar year and that the general rule that the country is the statistical unit is not made universal in the computation of all tables. The argument that the death rate in districts will furnish a key to the activity of mine inspectors is extremely faulty and comparisons of district death rates are, therefore, of little value.

**DETAILED REPORT OF MARION, MONONGALIA AND TAYLOR COUNTIES, WEST VIRGINIA.** West Virginia Geological Survey. By Ray V. Hennen and D. R. Reger, assistant geologists of the Survey. xvii+844 pp., 6x9¼ in. 11 Fig., 33 plates.

**ATLAS OF MARION, MONONGALIA AND TAYLOR COUNTIES, WEST VIRGINIA.** 6¼x9¼ in., 2 unmounted maps, 35½x41½ in., West Virginia Geological Survey, Morgantown, W. Va. Price of report and maps \$2.50. Topographic map alone 50c., geologic and structural map \$1 each.

These works are timely in view of the construction of the Buckhannon & Northern R.R. which opens up a large area of Pittsburgh coal described and mapped respectively in the two volumes. In addition to the detailed study and description of all the rocks, coals, limestones, clays, minerals, soils, streams and industries, with hundreds of oil- and gas-well records, coal analyses, etc., occurring within the area and given in this report, the geologic map gives the structural contours on the Pittsburgh coal, and thus is valuable to any one interested in coal, oil, or gas, as it shows the exact positions of all the anticlines, synclines and structural terraces. The suggestions of Ray V. Hennen, the author of the report, as to the location of prospective oil and gas territory are very full and complete in this report. His deductions in previous volumes relative to probable gas- and oil-bearing beds have been frequently verified.

The principal towns included in these counties are Fairmont, Morgantown, Mannington, Grafton, Farmington and Flemington.

It is interesting to note that the geologists have little hope that the Allegheny and Pottsville Series underlie the Pittsburgh formation in this section. East of the Monongahela, the wells and croppings show available coal but west of that river where, because of the depth of its horizon, there can be no surface indications of the fuel, the wells rarely record the Freeport coals and show no signs of the Mercer. Frequently round the rim of the Pittsburgh coal the lower productive measures are still found, but they thin out and disappear as the heart of the upper productive measures is reached. Before erosion occurred, this overlapping must have been more general. It is interesting to note how the coals of the Fairmont region bear out the general rule that Pottsville, Allegheny, Conemaugh and Pittsburgh coals are not found of workable thickness in the same cross-section.

**GEOLOGY OF THE NORTHERN SHAN STATES.** Memoirs of the Geological Survey of India. Vol. 39. Part 2. By T. H. D. La Touche, late officiating director, Geological Survey of India. vi+379+xli pp. 7¼x10¼ in. 27 plates, 11 fig., pocket with 3 geologic charts; Keegan Paul, Trench, Trübner & Co., London. Price, 4s.

The area surveyed lies around and northeast of Ava and Mandalay in British Burma. Its measures include most of the horizons from Archaean upward with the exception of Lower Tertiary and Cretaceous. The Tertiary beds contain some brown lignitic coal with a high percentage of moisture; the beds vary, one seam in the Lashio field attaining a thickness of 30 ft.

A table of analyses shows that the moisture varies from 6 to 23 per cent., volatile matter from 24 to 42 per cent., fixed carbon from 17 to 39 per cent., with ash between 1.4 and 40 per cent. As this lignite is irregular and is certainly poor in quality, and as it is located far from the coast and so situated that it must come in competition with the Burma oil fields, there is no possibility of its development.

**THE COLLIERY MANAGER'S POCKET BOOK, ALMANAC AND DIARY FOR 1914.** By Herbert Greenwell, joint editor, Colliery Guardian. 450 pp. +, 4x6½ in. 6 ill. 1 inset map. The Colliery Guardian Co., Ltd., 30 and 31 Fournival St., Holburn, London, E. C., Cloth 2s., Roan 3s., Calif 4s. 6d.

This useful little book appears in its 45th annual edition. We are unable to determine to what extent its contents are new, but much of the information certainly has not appeared in any earlier edition, as it is largely extracted from papers recently given before scientific bodies with some quotations from recent Bureau of Mines' bulletins. The questions set before candidates for mine manager and undermanager at the examinations held November, 1912, and May, 1913, are given in full; also the text of the new British mining act and several Home Office orders. There are many tables of value to mining engineers and much statistical information, especially relating to the mining industry.



## Coal and Coke News

### Washington, D. C.

On Jan. 27, the inquiry into mining conditions, which has been under consideration for some time past in the House of Representatives and in political circles generally was authorized, through the adoption of the so called "Keating" resolution introduced by Representative Keating. The resolution calls for an inquiry into the state of things in the Colorado coal fields and the Michigan copper district, the work being placed in the hands of the committee on mines and mining. Actual work will be carried on by subcommittees which are to actually visit the districts in question. They will have full authority to subpoena witnesses and require the production of all records and documents.

The investigation will be confined to the coal fields of Colorado in the counties of Las Animas, Huerfano, Fremont, Grand, Routt, Boulder and Weld, and to the copper mines of Michigan in the counties of Houghton, Keweenaw and Ontonagon.

The seven different subjects of inquiry specified in the resolution are: Whether the postal services are interfered with; violation of the immigration laws; whether citizens have been arrested and tried contrary to the Constitution or laws of the United States; whether conditions have been caused by agreements and combinations contrary to law for controlling the production, sale and transportation of coal or copper; whether arms and ammunition have been shipped into the fields for the purpose of excluding the products of the mines from competitive markets in interstate trade; and whether peonage exists or has been maintained. If any or all of these conditions exist, what causes led up to them.

The debate on the resolution was brief. Representative Keating outlined conditions in the Colorado coal fields, declaring that the "constitutional rights of citizens had been trampled upon."

Representative MacDonald, of Michigan, declared that the police power of the state of Michigan had been turned over to men imported by the copper companies. "The time has come for Federal investigation," he said. "The authorities of the state are either unable or unwilling to subdue the disorder."

Representative Kelly, of Michigan, opposed the resolution. He said that if the investigation was to be made it should be conducted by the Industrial Commission, which had ample authority to inquire into the conditions. Representatives Hardwick, of Georgia, and Garrett, of Tennessee, contended that Congress had no authority to make the investigation.

#### Hearings on Proposed Freight Increase

A beginning has been made in taking the testimony of shippers of bituminous coal who are opposed to the proposed increase of 5 per cent. on all railroads in official classification territory. Three days were set aside by the commission for the presentation of the case of these coal shippers, Feb. 2, 3 and 4, but during Feb. 2 only a small advance was made.

The Pittsburgh Coal Co. opened the discussion through its attorney, Frank Lyon, and began by contending that the shippers should not be compelled to put in their case until the roads had finished their arguments. Furthermore, he went on to contend that to grant the proposed increase would practically annul all orders for reasonable rates on coal issued by the commission during the past few years.

Mr. Lyon, who was formerly an attorney in the employ of the Commission, then directed his arguments into technical channels, contending that the railroads operating from the Pittsburgh district to the Great Lakes were not in the habit of keeping separate accounts showing the cost of moving passenger and freight traffic. He requested that the Commission should order separate figures representing these charges to be prepared. The matter was taken under consideration, and it was stated that should it be granted a special representative of the Commission would make them up.

After Mr. Lyon had finished, Edward S. Mead, of the University of Pennsylvania was called as an expert witness for the shippers. Mr. Mead's idea is that there is no good ground for the advance demanded until there can be some general basis of adjustment between the railroads, the employees' unions and the shippers, with the Government as a party in interest overseeing the agreements and guaranteeing that

an equitable arrangement is made between the different parties.

Mr. Mead is also of the opinion that rates at the present time are exceptionally high on soft coal and whatever is done with respect to the proposed increase of rates generally there should be no advance in the coal rates inasmuch as such advance would tend to unduly burden the miners.

#### Present Waste of Mineral Resources

In a statement issued by the Bureau of Mines as an extract from the forthcoming annual report it is estimated that the present waste of mineral resources in the United States is about \$1,000,000 per day, and it is claimed that there is urgent need for investigation and reform of methods. This need applies most strongly, it is said, to oil and natural gas. The Bureau estimates that it has been able during the past year to stop a waste of natural gas amounting to not less than \$10,000,000, a sum six times in excess of the total cost of the Bureau's investigations up to date. Continuing the Bureau says:

The waste in coal mining is another drain on our national wealth, which calls for serious and extended inquiry and investigation. A preliminary estimate, based upon limited inquiry and examination, indicates an annual waste or loss of coal in mining and handling of not less than 250,000,000 tons per annum. This represents a loss from our best and most easily mined coals and those nearest our great centers of industry. What is needed in connection with this loss is a thorough underground survey and examination at certain carefully selected areas in each of the important coal fields of the country, with a view to determining the exact conditions under which mining operations take place and the possibilities of adopting less wasteful methods. With this large amount of accurate information laid before the public, it will then be possible to obtain the adoption of far less wasteful methods of mining. Such an investigation, thoroughly conducted, would cost about \$50,000 per annum for three or four years. It is confidently believed that the results of such an investigation would mean a saving in fuel resources having a value to the nation of considerably more than \$50,000,000 per annum.

#### HARRISBURG, PENN.

Whether the commodities clause of the Hepburn act is effective in preventing a common carrier from transporting in interstate commerce any article or commodity in which the carrier has an interest, and, if so, whether, the Delaware, Lackawanna & Western R.R. complied with the decision of the United States Supreme Court which declared the clause constitutional, were the main points to be decided in the Government's suit against the Lackawanna, which was argued in the Circuit Court on Jan. 27.

The action was filed at Trenton, N. J., a year ago against the Delaware, Lackawanna & Western R.R. and the coal company, and the case was transferred to this state on expediting certificate of the attorney general.

The Government asked that the railroad be enjoined from transporting in interstate commerce any coal produced or purchased by it and transferred to it before transportation by the coal company and also asked that the existing agreements with regard to the purchase price of the coal be canceled. The grounds upon which the Government asked this relief are that the coal company is not a bona fide corporation, but is "a mere cloak" for the railroad company, and that the whole arrangement between the two is a violation of the commodities clause and the antitrust laws.

It was contended that the organization of the coal company was a "sham," a lawyer's device and a subterfuge to get around the law. The Lackawanna people pointed out that the coal is mined by a charter right by the railroad company, and it is sold at the mine to the coal corporation and that this coal is then shipped by the railroad to market. They also brought up the question as to whether or not the coal belongs to the railroad or to the coal company while in transit, and contended that it belongs to the coal company, and that the coal company is an entirely separate organization, not only as to officers, but as to books in every thing that goes into the operation of the concern.

The Government referred to interlocking directorates in the two companies and pointed that sons of directors of the railroad had been among the incorporators of the coal company. The Lackawanna people claim that it is no heinous crime in a man being a director in more than one corporation, even if it did appear to some people that interlocking directorates were a "badge of shame."



The Delaware, Lackawanna & Western Coal Co. was organized in 1909 after the supreme court declared the commodities clause constitutional. The railroad company declared a dividend of 50 per cent., half of which was used by the railroad stockholders in organizing the coal company. It was stated that approximately  $4\frac{1}{2}$  tons of the coal transported by the Lackawanna R.R. goes west to one ton that goes east to tidewater.

The Government contended that "the identity of the two companies is the same." "The directors are practically the same and the coal company is financed by the railroad. The stockholders are practically the same and the stock of both corporations is held by comparatively few persons. The coal company is not permitted to purchase coal from any other company, but the railroad." The Government showed the relationship of officials of the two corporations and called attention to E. E. Loomis, as president of the coal company, agitating himself, as vice-president of the railroad, over freight rates. The court reserved its decision.

After the conclusion of the trust suit hearing a petition was presented by the railroad company, asking that it be excepted from the decree canceling 6 per cent. contracts made in the suit brought by the Government against the Reading company and others in 1907. The ruling was made by the supreme court and affected the Delaware, Lackawanna & Western R.R. in two contracts with the People's Coal Co. at Scranton and the George F. Lee Coal Co., at Plymouth. Also the contracts between the Hillside Coal & Iron Co., and the Lackawanna Coal Co., Ltd., and the New York, Susquehanna & Western Coal Co., and Jermyn & Co.

The attorneys for the Government informed the court that there was no desire to press for the cancellation of these contracts, and the court instructed the lawyers to submit a decree under agreement for approval.

#### An Examiner Is Appointed

Appointment of an examiner to take testimony and the limiting of time in which to submit evidence in the suit of the Government against the Reading and other coal-carrying railroads brought in the Federal Court last October, were incorporated in a decree filed by Judge Gray, on Jan. 28, and Charles H. Guilbert, an official court stenographer was appointed examiner.

The court stipulates in its decree that the Government shall conclude the presentation of testimony not later than Mar. 10 next, and the Reading company and others must close all its proofs by Apr. 24. The special examiner is instructed to file with the court a transcript of the testimony taken by May 23.

The original suit to dissolve the so called anthracite coal trust was filed in 1907. After an extended litigation in the Federal and the United States supreme courts, it was decided to terminate the old action and begin new proceedings. This was done in October last and these defendants were named by the Government: The Reading company, the Philadelphia & Reading Ry. Co., the Philadelphia & Reading Coal & Iron Co., the Central R.R. of New Jersey, the Wilmington & Northern Rys. Co., the Lehigh & Wilkes-Barre Coal Co., the Lehigh Coal & Navigation Co., and the Lehigh & New England R.R.

#### A Demurrer Will Be Filed

Attorney-General Bell has announced that a demurrer would be entered by him to the action in equity brought to test the constitutionality of the anthracite coal tax law. The demurrer will be entered in the Dauphin County court within a short time, and it is probable that the question of jurisdiction under the circumstances will be raised.

During the week the Lackawanna County Court refused to grant an injunction to Mine Inspector Reese of the fourth district to have the People's Coal Co. stop mining operations in the surface veins in Scranton. The court did not dismiss the injunction bill, however, the latter being retained in order to allow either the mine inspector or the coal company to resort to arbitration for the purpose of determining whether there is any necessity for flushing the open chambers mentioned in the suit.

The court declares that "No question of surface support is at stake," inasmuch as no private right either of person or property is concerned.

On Jan. 28, Judge Edwards, of the above county court, declined to grant an injunction to restrain the Scranton Coal Co. from mining in the neighborhood of the Graff Furnace Co. property. The plant of the latter was damaged by mine cave settling a year ago.

The court found that the reservation clause in the deed to surface property purchased by the Furnace company, gives the Scranton Coal Co. the right to mine coal and does not call for providing support to the surface.

This is the case which brought from the manager of the plant, a charge that Judge Newcomb was holding up decision in the case so that a hearing could not be had before the supreme court at the session to be held in February. The decision of Judge Edward's makes this possible.

### PENNSYLVANIA

#### Anthracite

**Upper Lehigh**—The Upper Lehigh Coal Co. is sinking a new slope to tap a small vein underlying the Buck Mountain seam. The new vein is from three to five feet in thickness and underlies all of the old No. 1 workings, which up to a few years ago were considered the lower veins.

**Lopez**—Three locals of the United Mine Workers of America have been established in the Sullivan County mining section, and union organizers say that all the workers of that section will be strongly organized within a few weeks. About 1500 men are employed in the district. The wage scale in effect is about the same as the scale of the Wyoming anthracite region.

**Beaver Meadow**—Discovery of a 7-ft. vein of rich anthracite coal on the Penrose tract of 600 acres, between Beaver Meadow and Weatherly is reported. H. D. Stimson, a coal prospector, has reported on the discovery to the Penn Forest Coal Co., of Philadelphia, which owns the land.

**Nanticoke**—Surface settlements in the vicinity of Market and Broad Sts., which have been occurring for the past few weeks, broke out again on Jan. 29, damaging several properties and causing several gas pipes to break. Several large cracks are evident throughout the town.

**Lansford**—All men employed in the mines of the Lehigh Coal & Navigation Co. have returned to the old system of working through the dinner hour so that they can get home one hour earlier in the evening.

#### Bituminous

**Indiana**—The Penn Mary Coal Co., one of the largest operations in the state, will close down for an indefinite period. Slack orders and necessary repairs are given as the reason. The Penn Mary Coal Co. has recently had the finishing touches put to a number of cottages for the miners, bearing out the statement by some of the state mining officials that Heilwood is the model mining town of Pennsylvania. The coal company operates a modern sanitary dairy, the milk being supplied to the officers and miners alike at a low cost. Another feature of the place is a 100-acre truck farm on which are raised all kinds of vegetables for the use of the company employees.

**Uniontown**—Urging that a central mine-rescue station similar to those proposed for Fairmont and Clarksburg, W. Va., be established in the Connellsville coke region. Isaac G. Robby, inspector for the 5th Bituminous District, recently expressed his intention of taking up the matter with coke operators of the region.

**Smock**—Charging that S. P. Hooper entered the Colonial mines in an intoxicated condition with the safety of all of those employed in the mine in his hands, complaint has been filed against the man by Inspector P. J. Walsh, of the 9th Bituminous district.

**Connellsville**—Caught in the act of stealing coal cars in the Trotter mines on Jan. 23, Pompey Fitts was arrested and placed in jail pending a hearing. Fitts has been suspected for a long time, and a close watch was kept. He would remove the checks from the wagons of coal dug by other liners and put his own upon them. The checks of the rightful owners of the coal were destroyed. Each wagon of coal was worth 85c. and as the result Fitts was getting about twice his regular pay.

**Pittsburgh**—It is reported on good authority that plans are about consummated for taking the Four States Coal Co. out of the hands of the receiver by Mar. 1. The assets of the company are said to be in excess of the liabilities. This firm, together with other Jones interests, has been managed by a receiver since Dec. 6 last.

### WEST VIRGINIA

**Bluefield**—Col. Jas. S. Browning is seriously considering the development of his coal property near Falls Mills, and plans are already under way whereby a mine is to be opened at the mouth of Mud Fork near the Norfolk & Western dam. The location is about  $1\frac{1}{4}$  miles from Falls Mills station and the drift mouth will be located on the Lee Marsh property.

An effort is being made among coal operators to break up the habit prevalent at many mines of shooting from the solid. In Raleigh county, the E. E. White Coal Co. has declined to continue in employment any man found violating

the mining law in this respect, thus, endangering the lives of other miners as well as property.

**Mt. Clare**—A class in first aid work for the employees of the Hutchinson Coal Co. was recently organized here. About 40 men were enrolled, and much interest was displayed in the work. When the course of study is completed, it is the intention to organize two teams for service at the two mines of the company. These men will be kept in training and ready for any emergency that may arise.

#### ALABAMA

**Cullman**—It is expected that a reorganization of the Cullman Coal & Coke Co., which was put into the hands of receivers on Jan. 26, on account of a disagreement in the management, will be effected at an early date. Properties of the company are located near Bremen, Ala., consisting of a large tract of land and a private railroad connecting with the Louisville & Nashville at Cullman. Much money has been spent on improving and opening up the property, the most modern improvements being installed. The Cullman Coal & Coke Co., while having a few local stockholders, is composed mostly, and financed by Holland capital, Queen Wilhelmina being one of the largest stockholders.

#### TENNESSEE

**Jellico**—Seventy-five nonunion miners in the Blue Gem mines struck last week because of the discharge by the management of check-weighmen J. H. Duncan, G. J. Strunk and Grover Hickey, who entered a protest against the large size of the screens used. Manager James F. McPherson, who discharged the men, stated that the complaint was baseless, and that the screens used in the mines are of the kind authorized by the laws of Tennessee.

#### KENTUCKY

**Madisonville**—Definite announcement has been made that the Deep Water Coal & Coke Co., recently organized, with headquarters at Evansville, Ind., has acquired control of over 20 mines in the Henderson and Madisonville districts or western Kentucky. It is stated that contracts covering the transfer of these mines to the company have been closed, and that details of the deal are now being completed. The capitalization of the company is not known, but it is understood that \$6,000,000 is involved in the deal. A number of the mines have not been actively operated of late, but others are now marketing coal; and the intention of the company is to place all of the properties in first-class condition, for the purpose of reaching a large production, to be handled by river to New Orleans for foreign markets. A large acreage of undeveloped coal land has also been acquired by the company, upon which new mines will be opened as soon as possible.

#### OHIO

**Dayton**—The W. P. Rice Coal Co., of Dayton, Ohio, will open a new mine at Palos, Ohio, in the Sedalia seam in the near future. A shaft has been sunk and \$75,000 will be spent on equipment.

**Cleveland**—Ohio operators with offices in Cleveland let it be known that their delegates to the joint convention of operators and the United Mine Workers of America have positive instructions to enter negotiations with the wage-scale committee only after an agreement to abolish the check-off system of collecting union dues from the miners has been reached. They also are instructed not to make a wage contract providing for payment of miners on any basis other than the lump-coal plan now in force.

It is claimed that the screen-coal bill, if mines were operated according to its provisions, would increase the cost of coal 10 to 12c. a ton. The operators are emphatic in their statements that they cannot stand this increase and compete with West Virginia products. West Virginia coal has been the bug-bear of Ohio and Pittsburgh operators for years and the plea that West Virginia must be curbed is not a new one in a crisis.

#### INDIANA

**Terre Haute**—It is believed that the output of this field will be the smallest for January that it has been in seven years. Some operators recall that there have been seasons when hardly freezing weather prevailed until February, and then the short month gave enough zero temperature to make an average winter coal consumption. Such a February is now the only hope for the revival of the domestic coal trade. There is, however, an appreciable increase in the demand for steam coal, and the reports are for a revival in the industrial world.

**Jasonville**—The 200 miners who have been idle several weeks on account of a strike at the Queen Coal Co.'s mine

near here went back to work on agreement that the decision by a board of arbitration should apply for all their working time.

#### ILLINOIS

**Pana**—The Pana Coal Co. has announced a suspension of operations at Mine No. 2 ordering all men to take out their tools. Three hundred miners are thrown out of employment. Falling off in business is assigned as the cause.

The Elly Coal Corporation has announced that plans have been completed for opening its 30,000 acres of coal lands in Christian, Montgomery and Macoupin counties. This comes as encouraging news to several thousand coal miners who have been thrown out of employment during the past month by the suspension of operations in many of the largest mines in this section of the state.

**Girard**—Three mines operated by the Superior Coal Co., at Girard, turned out 281,183 tons of coal in the month of December. This was more than the output of any single month in the previous history of the mines. For the first week in January, these operations averaged a daily output of 11,981 tons.

#### COLORADO

**Trinidad**—A parade of striking miners and sympathizers, on Jan. 23, was dispersed by state militiamen using clubbed rifles and sabres. Several arrests were made, among them being seven women.

#### ARKANSAS

**Fort Smith**—One thousand union coal miners, employed by the Central Coal & Coke Co., of Kansas City, Mo., at Hartford, Huntington and Bonanza, went on strike Jan. 29. The union alleges the company refused to abide by the decision of the district arbitrator who reinstated four unemployed men.

#### OKLAHOMA

**Sutter**—Fire in the wash house of the local coal mine on Jan. 22 destroyed the building, and the miners lost much of their clothing.

#### SOUTH DAKOTA

**Rapid City**—J. P. McElroy and associates are carrying on diamond-drill operations near Interior, in the hopes that coal deposits will be found of sufficient size to warrant working. Indications point to deposits of coal, but the extent of the same has never been determined. A company has been incorporated and will drill for oil on the ground adjoining.

#### UTAH

**Storrs**—On Jan. 26 an avalanche destroyed several houses and killed three persons. Among the dead were two Greek miners.

#### WYOMING

**Glenrock**—While drilling for water on the Higgins ranch, two miles from here, a good grade of oil was encountered at a depth of 100 ft. Preparations have nearly been completed for installing an oil rig and developing this field in different places.

## FOREIGN NEWS

**London, England**—London's coal strike came to an end Jan. 28, when the men returned to work on the old terms, except in the case of the employees of Sir Edwin Cornwall, who granted the union's demand.

## PERSONALS

Governor Tener, on Jan. 29, appointed Edwin Ludlow, vice-president and general manager of the Lehigh Coal & Navigation Co., of Lanastord, as trustee of the State Hospital at Coaldale.

John W. Johnson, a colored miner of Riverton, Ill., recently settled a \$25,000 damage suit against his employers for \$750. The settlement came by an agreement after the suit was called for trial.

Robert B. Maloney has been appointed general superintendent of the mine of the Davis Coal & Coke Co., with offices at Thomas, W. Va., in the place of Harry Sharp, who resigned to enter business for himself.



John Jarnigan, organizer for the United Mine Workers of America, was given a verdict of \$5000 against the Pennsylvania Coal Co. by a jury in the United States court at Fort Smith, Ark., recently. Jarnigan sued for \$30,000, the amount being reduced materially by the decision.

Safety Superintendent of Ohio mines, J. M. Roan held several meetings with miners recently in an effort to install better mining methods. He recently addressed two meetings, one at Martins Ferry and the other at Barton, and later a meeting of miners of the Crooksville district at Crooksville.

Edward J. Corrigan was elected to the presidency of the Kansas City Midland Coal & Mining Co. at a recent meeting of stockholders. He fills the vacancy created by the death of the late Bernard Corrigan. The new president, who formerly was secretary, has relinquished the latter office, but retains that of treasurer. Emmet Corrigan has been made secretary. The company's mines are located in the Novinger, Mo., district.

A. E. Williams, for many years lake freight agent of the North-Western Fuel Co., with offices in the Rockefeller building, resigned recently. E. P. Carey, of St. Paul, Minn., secretary of the company, and J. L. Forepaugh, of the St. Paul offices, arrived in Cleveland to take charge. Mr. Williams was immediately relieved as he had requested and Mr. Forepaugh was placed temporarily in charge. No decision has been reached as to who will succeed Mr. Williams.

## OBITUARY

George W. Barager, general manager of the Pardee Bros. & Co., died on Jan. 27, at the Medico-Chi Hospital at Philadelphia. He went to the hospital for the purpose of having an operation performed for a throat affection, and while under the anaesthetic, died from heart failure. Mr. Barager was born in Hazleton, graduated from Lehigh University in mining engineering in 1900. He entered the employment of the Lehigh Valley Coal Co. as district superintendent, and succeeded A. W. Drake as general manager of the above company a short time ago. He was also a director of the Freeland Mining & Mechanical Institute, and chairman of the Board of Education of the Y. M. C. A.

## CONSTRUCTION NEWS

**Woodward, Ala.**—The Woodward Iron Co., operator of furnaces, manufacturer of coke and miner of coal, will start immediate work on the construction of 30 modern by-product ovens at a cost of approximately \$400,000, the ovens to be located at Woodward, Ala.

**Pikeville, Ky.**—The Sharon Coal & Coke Co., of Newton, Penn., is beginning the initial work on a big coal-mining development on Blackberry Creek in Pike County and will build a first-class industrial coal-mining city and expend several million dollars in the work. The home office of the company is in Newton, Penn., while offices will be retained in Huntington.

**Woodward, Ala.**—In connection with the 30 by-product ovens to be constructed by the Woodward Iron Co. at Woodward, Ala., the American Creosoting Co. will build a creosoting plant at Woodward, utilizing the coal-tar from the by-product ovens. The plant, work on which will start immediately, will consume approximately 6,000,000 gal. of coal tar yearly. The plant will cost \$250,000.

**Whitesburg, Ky.**—It is reported that track laying on the line of the Carolina, Clinchfield & Ohio R.R. through the "Breaks" of the Big Sandy has been started between Elkhorn City, Ky., and Dante, Va., and will be rushed to completion as soon as possible. The tunnels on the line, 40 in number in 32 miles, are completed, and the remainder of the construction work will not take long, it is believed.

**Pittsburgh, Penn.**—The Dravo Contracting Co. has just been awarded the contract for the complete construction of two modern concrete-lined shafts for the Ford Collieries Co. on its property between Bakerstown and Curtisville, Allegheny County, Pennsylvania. The Ford company is contemplating the construction of a plant modern in every detail and ground will be broken in February for the sinking of these shafts.

**Quicksand, Ky.**—The Wolf Valley Coal Co. which recently

purchased 2000 acres of coal land near here will start at once the initial work on a first-class coal-mining plant—the largest in Breathitt County. The new coal operation is to be reached by a five-mile spur line of the Lexington & Eastern from Haddix, construction of which has already been started. A first-class coal-mining industrial city will spring up, its building having begun.

## NEW INCORPORATIONS

**Little Rock, Ark.**—The Southern Coal and Land Co. has surrendered its charter.

**Cleveland, Ohio.**—The Northern Coal & Dock Co., of Cleveland, Ohio, has filed papers with the secretary of state increasing its capital stock from \$300,000 to \$500,000.

**Grand Junction, Colo.**—The Winton Coal Co. has been organized with a capital of \$50,000. The incorporators are Susie B. Fletcher, Howard G. Fletcher and Susan J. Winton.

**Akron, Ohio.**—The North Branch Coal Co., of Akron, Ohio, has been incorporated with a capital stock of \$100,000 to mine and deal in coal. The incorporators are William McConahy, F. W. Robson, H. L. Houk, M. D. Kuhlke and H. A. Hine.

**Shelby, Ky.**—The Shelby Coal Co. has been organized with \$60,000 capital to develop the old Bartley coal tract near here on the Sandy Valley & Elkhorn R.R. Work will start within 60 days. J. W. Morrell, W. M. Smith and others are the incorporators.

**Salem, Ohio.**—The capital stock of the Salem Mining Co. will be shortly increased from \$75,000 to \$150,000. The company has purchased extensive coal lands adjoining its present holdings which will be developed during the present summer. Charles Estep is president, M. C. Yoder, vice-president, while J. E. Morgrett is superintendent and purchasing agent.

## INDUSTRIAL NEWS

**Piedmont, W. Va.**—The Elkins Coal & Coke Co. has secured a large coal contract from a New York firm. The order calls for the delivery of 10,000 tons per month for one year at New York City. Shipments have already begun.

**Sandusky, Ohio.**—The city of Sandusky has pledged \$50,000 toward the improvement of the harbor at that point. This money is to be provided on condition that plans and specifications prepared by United States engineers are approved. It is proposed to deepen the channel to a uniform depth of 23 ft., extending the Cedar Point jetty and build the pier at the end of the new lighthouse which will cost \$450,000.

**Washington, D. C.**—Kentucky coal operators on Jan. 27 complained to the Interstate Commerce Commission that the Louisville & Nashville and other roads operating in southern, and central western territories, including central freight association territory, charge unreasonable and discriminatory rates on coal outbound and other traffic inbound, to and from all points in the territories in which these roads operate.

**Columbus, Ohio.**—According to a report recently issued Ohio shipped 6,176,683 tons of coal via the lakes to the Northwest during the season of 1913 as against 4,676,000 in the previous season. Lake shipping was the mainstay of the coal trade in Ohio during the months of navigation. The outlook for an active lake trade in 1914 is not bright as there is a large tonnage on the docks of the upper lake ports ready for movement to the interior.

**Indianapolis, Ind.**—Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal association submitted an interesting report of the work of the organization at a meeting of the officers and board of directors at Indianapolis recently. He showed the present membership to be 1716 and rapidly growing and predicted that it would not be long before practically every dealer in the three states would be united with the organization. The annual meeting of the association will be held at Indianapolis some time in June, the exact date to be fixed later by the local committee in conjunction with the president and secretary of the association. It will be only a two-days session with one evening given over to entertainment. Entertainment tickets will be given only to those who attend the business sessions of the convention. Shippers will not be asked to contribute toward the entertainment.



# Coal Trade Reviews

## General Review

**Concessions on domestic sizes of anthracite the rule. April discount expected on individual coal by Feb. 15. Rigid curtailment in bituminous and sellers offering all kinds of inducements. Anticipated suspension still fails to start any buying movement and market continues flat.**

The anthracite market is replete with signs of an abnormally depressed condition. All the large hard-coalers, without exception, are under restricted operation this week, and the curtailment is spreading even to the individuals. Moderate concessions on the regular circular for prepared sizes are readily obtainable, and conservative members of the trade expect a sharp break to the Apr. 1 discount by the middle of the current month, these prices already being quoted in some exceptional instances. Companies are eagerly seeking orders, which are promptly filled, and the situation is particularly flat at tidewater. The steam sizes are the only ones to show any strength; under the restricted production, the supply of these has become so short as to command premiums in some instances.

Bituminous agencies are instructing the mines to shut off shipments, and there is a reduction in the amount of consignment coal on the market which has had a steadying effect upon the soft-coal situation. As a result, circular prices are somewhat better maintained, although it is not yet believed that the market has touched the bottom. There are some inquiries on contracts for the new year, but nothing significant has developed as yet. Consumers are not showing any inclination to meet the high level of last year and indications point to a considerable delay in getting together. Shippers, as a rule, are offering all kinds of inducements, and consumers are getting a substantial advantage in their fuel costs.

The opinion prevails in the Pittsburgh district that an early settlement of the new wage scale will be effected, but reports from other points are of such a contradictory nature as to throw considerable doubt on this opinion. In any event, the possibility of a suspension has failed to stimulate business, and the demand continues limited with price-cutting the rule; the movement on contracts is light, and the domestic grades are the duller for years.

A large amount of demurrage coal is reported in Ohio, and the Northwest, while the general absence of any sustained demand, together with the heavy over-supplies, has resulted in a condition bordering on demoralization. Expectations of a suspension in mining seem more prevalent here, and some buying is noted in anticipation thereof. Heavy chartering of lake vessels was the feature of interest during the week.

The January dumpings at Hampton Roads will be lower than the December figures, but in spite of the light movement, prices are well maintained, and no important cutting of the circular is anticipated, although there are large accumulations. Southern operators are curtailing production in hopes of stimulating business, but there is little change in the situation there.

A scarcely perceptible improvement in the Middlewestern market is noted, with a slightly increased demand from the Northwest. There is still considerable coal on demurrage, however, and the market is not materially changed.

## EASTERN MARKET

### BOSTON, MASS.

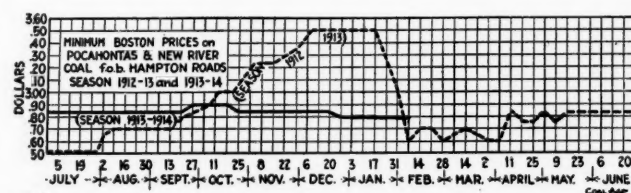
**A few early buyers entering the market but nothing significant so far is heard. Trade extremely dull. Inland prices slightly better now than consignment coal has been absorbed. Restriction general among operators. Anthracite moving mostly to Eastern storage depots, an unfailing sign of dull business.**

**Bituminous**—A few of the large mills who are usually early buyers have come into the market this week for their usual supplies of Pocahontas or New River. There is therefore a mild scurrying on the part of some of the agencies to play for position but, so far nothing significant has been re-

ported. The \$2.85 basis is apparently better maintained than a week ago and only a few shippers are now making concessions. Spot sales, however, are still of small tonnages and it cannot be said the market is really any firmer. It is more that the curtailment is so general that coal is not piling up at the piers to the degree it was a fortnight or so ago.

New England trade is certainly dull. Some buyers are finding that they so far over-bought last year that they are not likely to buy this year until June and such instances are more frequent than might be supposed. It is some indication of the state of things when no one of the three large cargoes that foundered in the January gale is to be replaced by other shipments, at least not for the present.

Coal for distribution inland shows a slightly better tone, due more however to the disappearance of recent "market cargoes" than to any improvement in demand. Manufacturers are still cautious and coal is not the only trade that is slow and apathetic.



All the Pennsylvania shippers are trying hard for spot business and offering all the inducements they dare, but the movement is light and confined largely to the quality grades. Georges Creek mines are also under restriction, but with no concessions from season prices.

**Anthracite**—The companies are keen on getting business but the weather has slumped again and retailers are still holding back. Those shippers who own storage depots in this territory are loading up their barges for these points, which is always an unfailing sign of extremely dull times in anthracite.

Current wholesale quotations on bituminous are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	\$0.95@1.50	\$1.25@1.55	\$1.67@1.77	
Philadelphia*	2.20@2.75	2.50@2.80	2.92@3.02	
New York*	2.50@3.00	2.80@3.10	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.80@2.85
Boston†				3.58@3.63
Providence†				3.58@3.68

\*F.o.b. †On cars.

### NEW YORK

**Does not seem to be any market whatever for prompt soft coal. Prices moderately good and holding firm in spite of adverse conditions. Slump in the prepared sizes of anthracite to the April circular anticipated by Feb. 15. Steam grades stronger under the heavily curtailed operations.**

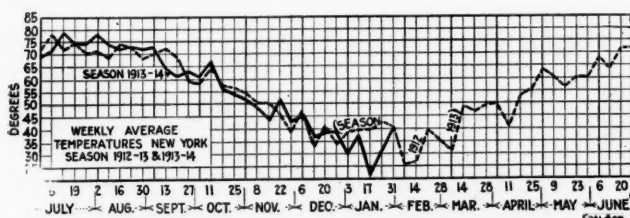
**Bituminous**—Conditions in the New York soft-coal market have seldom been worse in the mid-winter season than is now the case. It is simply a condition where there is no business whatever to negotiate. So far as quotations go, the true condition of the market is not adequately reflected in the prevailing price level, producers having consistently maintained a relatively profitable figure in spite of adverse conditions. It seems to be the feeling that with no buyers in the market, nothing would be gained by attempting to force the market with concessions. This applies particularly to the better grades, which are always the last to suffer in a depressed market. Only occasional reports of consignment coal on demurrage are heard, but there is probably more of this than is generally thought.

Contract business is the mainstay of the market at the moment. The larger companies in particular report a fairly good movement in this line, but others state that there are many suspensions. The possibility of labor troubles is having a tendency to increase the requisitions in order to accumulate some surpluses. However, most consumers as a rule are heavily stocked up and not many are prepared to take in more coal.

We continue to quote the New York market weak, but unchanged as follows: West Virginia steam, \$2.60@2.75 good grades of Pennsylvania, \$2.75@2.85; best Miller Pennsylvania, \$3.10@3.20; George's Creek, \$3.15@3.25.

**Anthracite**—Further adverse developments in hard-coal continue to be reported. Conservative members of the trade look for a general recession on individual coal, by the middle of the current month, down to the Apr. 1 circular. Such a slump usually occurs about Mar. 15, but it is clear to all that the circular will not be maintained that long this season.

As a result of the curtailed production, the supply of steam grades is not up to the requirements, there being a particular shortage of No. 2 buckwheat. A further curtailment in mining operations will tend to cause a relatively firm price situation in this department. The reserve supply of finer grades has all been picked up, while some of the companies are now finding it necessary to put some of the prepared sizes back into storage.



The domestic grades are all in heavy over-supply, dealers being so full up that they are unable to take any additional tonnage in spite of the attractive offers made. Concessions on the regular circular of 15 to 20c. per ton are readily obtainable on all the prepared sizes, and there are many individuals who would doubtless quote the full April circular on all-rail orders. As a rule, the independents are not as yet restricting mining but operations of the big companies have seldom been so curtailed, the Lehigh Coal & Navigation, Reading and Susquehanna collieries all closing down Wednesday for the balance of the week.

We quote the New York market for hard coal off on the domestic grades, but with the steam sizes a trifle stiffer as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken.....	\$5.00	\$4.60@5.00	\$5.05	\$4.55@4.95
Egg.....	5.25	5.00@5.25	5.30	4.75@5.20
Stove.....	5.25	5.05@5.25	5.30	5.00@5.20
Chestnut.....	5.50	5.25@5.50	5.55	5.20@5.45
Pea.....	3.50	3.50	3.50	3.45
Buckwheat.....	2.75	2.75@2.85	2.70@3.45	2.25@2.70
Rice.....	2.25	2.25@2.35	1.95@2.20	1.85@2.20
Barley.....	1.75	1.75@1.80	1.70	1.50@1.70

#### PHILADELPHIA

**Hard coal outlook unfavorable.** Difficult to move the production even under restricted operations. Prices on domestic quoted down to the April circular. Bottom point in soft coal not yet reached.

Coal dealers, both, wholesale and retail, still regard the outlook pessimistically. The past week has been anything but propitious. Summer weather so closely follows a little lowering of the thermometer, that most of the householders take a chance, and this is reflected on the meager demand on the retailer. Curtailment of work at the mines still continues. Outside of the steam sizes, the operators are hard put to dispose of their output, even with the reduced mining; with the month of February well on its way, and predictions for continued warm weather, the prospect is not favorable. It is intimated that even some of the individuals contemplate a curtailment of production, which is something unusual.

The trade will not take coal they do not want, and with yards well stocked, even the inducement of April prices, does not always produce an order. The tidewater business is distinctly flat and the New England market is simply buying from hand to mouth, with the result that orders are coming in slowly. The dealers wait until they have enough orders in sight to dispose of a cargo, before placing a schedule, knowing that there will be little or no delay in its fulfillment.

The bituminous market is running the anthracite a close second. There is a feeling that the bottom of the market, as far as prices concerned, has not as yet been reached, and every inducement in the way of prompt deliveries and attractive prices, fails to land sufficient business to keep operations in full swing. Advances over last year's contract prices are not being considered; it will wind up the same as last year, when many of the large steam users shopped around for their supplies, rather than tying themselves up on contracts.

#### BALTIMORE

**Improvement in business handled over the local piers.** Demand light, and the general situation not promising. Warm weather still has its effect on anthracite trade.

Prices are considerably below what they were in February of last year, and the demand is not as brisk as was the case at that time. The best demand has been in the coast-wise contract business. Shipments were noted both from the B. & O. piers at Curtis Bay and the Western Maryland piers at Port Covington. A large number of charters have already been announced for February loadings, in addition to the fleet of coal colliers that run regularly. Foreign business looks brighter, as not only South and Central America, but Europe, is in the market through this port.

Local demand for soft coal is light, and in fact the general state of the market is poor. Many leading industries are taking little or no fuel. Pennsylvania best grades are holding around \$1.25, with lower grades at from 95c. to \$1.10. West Virginia steam fuels are demanding about 90c. at the mines. The coal situation is weak, offerings of three-quarter being made in some instances as low as 75 cents.

### CENTRAL STATES

#### PITTSBURGH, PENN.

**Wage scale conference this week in Philadelphia.** Difficulty in adjusting scale for two years beginning Apr. 1 may prove less than expected. Demand continues poor, with prices irregular. Connellsville coke slow, at practically unchanged prices; shipments increased.

**Bituminous**—The Pittsburgh district operators are sending to the wage scale conference in Philadelphia, arranged to begin Tuesday, February 3, W. K. Field, John A. Donaldson and Geo. W. Schluederberg, of the Pittsburgh Coal Co., and W. W. Kiefer, W. A. Luce, J. H. Sanford, William Henderson and Michael Gallagher of independent coal companies. Ohio and Indiana will be represented at the conference, as usual, while Illinois will also this year be represented. The Illinois operators are understood to be less anxious than others to change the base of the scale to mine-run as they have already developed the system. Van Bittner, president of the Pittsburgh district miners' organization, will head the men in the wage conference. While for several months the opinion seems to have been that the wage settlement this year would involve a long controversy, there appears to have been a change of opinion in some quarters of late, whereby there are some predictions that only a short suspension will occur.

The local coal market has continued in an unsatisfactory condition, demand being limited and price cutting common. While it is possible that there may be some extra demand this month and next, to provide consumers with stocks against a possible cessation in mining, there is no evidence thus far of any such demand. Shipments against contracts with manufacturers are light, although there has been a slight improvement in steel mill operations, railroad consumption shows no improvement, and domestic demand is the poorest for many seasons, doubtless on account of the extremely mild weather. List prices, which are frequently cut, remain as follows: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¼-in., \$1.40; 1½-in. steam, \$1.50; 1½-in. domestic, \$1.55, per ton at mine, Pittsburgh district.

**Connellsville Coke**—The coke market has been quiet, and inquiry for February is developing more slowly than was expected, from furnacemen who covered January requirements only. The prompt market continues to be quoted at \$1.90, but there is ground for suspicion that consumers requiring a round tonnage can shade the figure materially for early shipment and it is possible that not much coke will be bought for the whole month. The contract market is dead, but remains quotable nominally at \$1.90 to \$2. Foundry coke is in fair demand, and is quotable unchanged at \$2.40 to \$2.65 for prompt and contract, though transactions are usually at near the lower limit.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ending Jan. 24 at 291,055 tons, an increase of 22,698 tons, and shipments at 290,586 tons, an increase of 25,802 tons.

#### BUFFALO, N. Y.

**Activity in bituminous disappeared with return of mild weather.** Trade discouraged and mines are running slowly with no apparent prospect of recovery. Anthracite very quiet. Furnace coke a little better.

**Bituminous**—The activity resulting from the colder weather was all lost as soon as it became mild again, and the dealers



have instructed the mines to shut off. It is not denied that the apparent consumption is better than early in January, but it is not good enough to keep the mines running at anything like full capacity. So long as the output was cut down by the car shortage, prices held up, but the mines will not restrict operations, even after so much trouble from over-production. Consumers, especially the railroads, are getting a big advantage this winter in their fuel cost.

There is again complaint of coal on track unsold, though not so much as when the December slump took place; reports from the mines are to the effect that the men are grumbling over short work, viewing the situation as some sort of a combination against them. At the same time the railroads are reporting better business as a rule, and certain officials predict a steady recovery. There is a good movement of contract coal, but spot sales have run down. The prices of bituminous are weaker than they were a week ago, being based on \$2.80 for Pittsburgh lump, \$2.70 for three-quarter, \$2.55 for mine-run and \$2.10 for slack, with Allegheny Valley coal about 25c. lower.

**Coke**—There is no change in the price of coke and none is looked for right away, but so many furnaces have blown in since the first of the year that furnace coke is comparatively more active now than foundry. Quotations remain on the basis of \$4.50 for best 72-hr. Connellsville foundry.

**Anthracite**—The slump in the weather has hit the anthracite trade harder than anything else, especially as the season is now getting so late and the April reduction less than 60 days off. Consumers say they are running fires as low as possible, only burning as much coal as they commonly would in October.

All anthracite mines are running slow and there is preparation here to resume loading into vessels in order to get rid of the surplus. There are reports of big piles of coal at all upper-lake ports, which will disappear only with the return of steady winter.

#### TOLEDO

**Domestic demand much restricted by the warm weather. Circular fairly well maintained. Colder temperatures momentarily stimulated the market.**

Continued warm weather has worked havoc with the local market. The slow demand for domestic coal is most unusual for this season of the year and the dealers are feeling it, although the demand for steam coal has kept quite close to normal. This is due in the main to the possibility of a shut-down of the mines. It is known that the railroads also are acting upon this conclusion and are storing large tonnages.

Despite the short demand prices have remained fairly stationary, although most coal offices have recorded sales below the circular. There has been little speculative attitude regarding the weather among the dealers and with their bins full even the lowest prices fail to create interest. For this reason quotations have held pretty close to list. The cold temperatures recently proved a temporary stimulus to the trade.

According to latest reports the Hocking Valley Docks will be near completion upon the re-opening of navigation this spring. This dock with a capacity of 20,000 tons in 10 hr. will be a great factor in facilitating shipping.

Prices are quotable as follows:

	Pocahontas	Hocking	Jackson	Pomeroy	Massilburgh	Pitts-on	Cambridge
Domestic lump..	\$2.50	\$2.00	\$2.50	\$2.25	\$2.50	\$1.40	\$1.40
Egg.....	2.50	1.35	2.50	1.50	2.50	.....	.....
Nut.....	1.75	0.80	2.00	1.75	2.50	1.35	1.20
1/2 lump.....	.....	0.90	.....	.....	.....	1.30	1.20
Mine-run.....	1.40	1.10	.....	.....	.....	.....	.....
Slack.....	.....	0.65	.....	.....	.....	.....	.....

#### COLUMBUS, OHIO

**Continued unfavorable weather has weakened the coal trade still further. Demoralization may result unless some relief appears soon. Prices unsteady and the volume of business small. Large quantity of demurrage coal on Ohio markets.**

The local trade is weak and unsettled, due principally to the continued mild weather. The demand for domestic and steam grades is lacking and there is an overstock of all kinds. Consequently prices have weakened materially, although the larger operators and shippers are making every effort to maintain the market.

Dealers stocks are large and they are not inclined to buy. Unless colder weather arrives soon, stocks of some dealers will certainly have to carry over until the coming season. In fact there is practically no demand for domestic grades and as a result, there is little price cutting resorted to in order to force the market.

The steam business has been more steady than domestic

but even it has been weak. Practically no stocking is being done in anticipation of a suspension Apr. 1, but some is expected in February. All contracts which expire at this time are reported as being renewed on about the same basis as last year.

One of the worst features of the trade is the large amount of demurrage coal on the markets in Toledo and the Northwest; this affects the Columbus market materially. The coal is being disposed of at extremely low prices. The indications for a good lake trade next season are not good since reports show a large amount of coal on the docks of the Northwest. Unless colder weather comes there will be considerable to carry over.

Production has been rather slow in all fields. The Hocking Valley district reported about 40% of the average with many mines shut down completely. In Pomeroy Bend district the conditions are not much better, but the domestic fields are probably the worst sufferers as there is practically no demand for the domestic sizes. In Eastern Ohio the production is estimated at 45% of normal.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	\$1.50 @ 1.45	.....	\$1.50 @ 1.45	\$1.50 @ 1.40
3-4 inch.....	1.35 @ 1.30	\$1.20 @ 1.15	1.35 @ 1.30	1.35 @ 1.25
Nut.....	1.25 @ 1.20	.....	1.30 @ 1.25	1.25 @ 1.20
Mine-run.....	1.15 @ 1.10	1.10 @ 1.05	1.15 @ 1.10	1.15 @ 1.10
Nut, pea and slack..	0.80 @ 0.75	.....	0.85 @ 0.80	0.80 @ 0.75
Coarse slack.....	0.70 @ 0.65	1.00 @ 0.95	0.75 @ 0.70	0.70 @ 0.65

#### CLEVELAND

**Bargain prices quoted to move demurrage coal on track. The lake freights to Lake Michigan reduced to 30c. a net ton. The Lake Superior freight rate has been reestablished at 30c. a net ton.**

Short time in many Cleveland manufacturing industries, combined with weather that greatly reduced the demand for domestic coal, has put the local market at the lowest point in recent years. Mine-run seems to be the heaviest, having recently sold at slack prices. Some operators have coal that has accumulated four days demurrage and is likely to pay more before it can be moved.

Youghiogheny is being quoted at circular, but because of the low prices it is not coming into this market extensively. No. 8 coal has sold the last few days as follows: 1 1/4-in., \$1.80 @ 1.90; mine-run, \$1.75 @ 1.85; slack, \$1.60 @ 1.75. Middle district coals are bringing the same price as No. 8.

Retail dealers are so well stocked-up, they have shut off orders. The warm weather during the week ending Saturday had the effect on the retail consumers and domestic orders were postponed. At the low prices operators and jobbers have advised their customers to dock coal. There has been some docking so far and if the market shows an improvement considerable more storing will be done. The opinion is general that the suspension Apr. 1 will be more protracted than usual. As soon as the market shows a return to normal, buyers will lay in heavier supplies.

**Lake Vessel Rates**—The Milwaukee-Western Fuel Co., of Milwaukee, Wis., had quietly chartered vessel capacity to transport 1,300,000 tons of soft coal from Lake Erie ports to Milwaukee during the navigation season of 1914 at 30c. a net ton. Last year this company paid 35c. a ton, having come into the market after the bulk of the chartering was done. The C. Reiss Coal Co. contracted last year for shipment to Sheboygan, Wis., at 32 1/2c. with a reduction to 30c. if the vessels were unloaded within 48 hr. after arrival at the port of destination. Chicago, Indiana Harbor, and Waukegan also paid 35c. As the Milwaukee-Western contracts are taken by several vessel owners, the general rate to Milwaukee and other Lake Michigan ports will be 30c. The contracts are for three years.

Following this announcement it became known that the Lehigh Valley Coal Co. had chartered vessel capacity to move between 500,000 and 600,000 tons of hard coal from Buffalo to Duluth-Superior, and to Milwaukee and other Lake Michigan ports at 30c. Simultaneously announcement was made that soft-coal contracts for close to 1,000,000 tons had been placed with vessel owners for Lake Superior delivery at 30c. Since then it has developed standing contracts, with a stipulation that the going rate shall be paid, have been approved on the 30c. rate. Altogether close to 5,000,000 tons of coal have been accepted by vessel owners for 1914 at the 30c. rate. The business is so well scattered and so large that it is not likely any changes will be made to the principal ports until fall when the late rush starts about Nov. 20.

With a gross lake movement of soft coal, including bunker coal, of 28 million tons in 1913, it is apparent that not more than 25% of the business for the coming season has been closed. In the hard-coal trade, which was 5 million tons last year, 90% of the lake freighting contracts are still to be drawn.



## DETROIT, MICH.

Trade continues heavy in spite of severe storm. Orders on contracts restricted. Many cars on demurrage.

**Bituminous**—Although Detroit experienced one of the severest storms of the season, last week, it failed to relieve the pressure incident to the adverse conditions in the market. As a result, there has not been much of an increase in the volume of business, and although mine prices seemed to be moderately well maintained, there are many reports of price cutting. Steam business is considered slack all along the line, and expiring contracts are being renewed at the same figures as last year.

Conditions in the domestic trade remain unchanged, large stocks still being the rule. Because of the adverse weather conditions, dealers have not been able to move the coal, and are naturally not disposed to do any further buying. Reports state that there are approximately 500 cars of coal standing under demurrage in the local yards, and the necessity for disposing of this is of course having an adverse effect upon the situation. Generally speaking, the January trade is considered the worst for years. Even the requisitions on contracts have been materially reduced, which have proved the most discouraging feature of the situation.

The bituminous market is now quotable on the following basis:

	W. Va. Splint	Gas	Hock- ing	Cam- bridge	No. 8 Ohio	Poca- hontas	Jackson Hill
Domestic lump.	\$1.25	....	\$1.30	....	....	\$2.25	\$2.20
Egg.	1.25	....	1.30	....	....	2.25	2.30
Nut.	1.10	....	1.00	....	....	....	....
Steam lump.	1.05	....	....	....	....	....	....
3-in. lump.	1.10	\$1.00	0.90	\$0.90	\$0.90	....	....
Mine-run.	0.85	0.90	0.80	0.80	0.80	....	1.25
Slack.	0.90	0.90	0.75	0.85	0.85	....	....

**Anthracite**—The warm weather has had a still further depressing effect upon hard coal also. As with bituminous, there is considerable anthracite on demurrage, and it is stated that much of this is being offered at 50c. off the circular.

## HAMPTON ROADS

Local conditions show little improvement. Demand light with ample coal on hand, but no further price cutting. Heavy losses at sea.

Owing to the dull market the movement of coal in Hampton Roads has been light during the entire week, although the arrival of bunker steamers was fair during the early part. The government has loaded two colliers at Lamberts Point, one of them taking about 12,000 tons and the other 4000 tons. Practically all of the coal moving has been run-of-mine, demand being almost entirely for this grade. Prices are the same as for several weeks, and although there may be somewhat of an accumulation in the railroad yards, the prospects are that there will be no cutting in prices.

Figures are not yet obtainable showing the dumpings for January, but these will be below the December figures. As usual the largest dumping will be made by the Norfolk & Western Ry. from Lamberts Point. This road is now operating their new pier, and while everything is not working as smooth as it is should several large vessels have been taken care of there, and good time made in their loading.

Vessels loading coal for foreign ports have cleared for Genoa and Naples, Italy; Bermuda; Barbadoes; Campana, Argentine Republic; Cristobal; Dakar, West Africa; Kingston, Jamaica, and Cerea, Brazil. Of coal shipped from Hampton Roads ports during January approximately 20,000 tons have been lost at sea.

## LOUISVILLE, KY.

Some colder weather failed to relieve the market. Trade heavily loaded with coal obtained at bargain prices. Operations much restricted.

Some wintry weather has revived hope in the trade that there may yet be a demand for fuel. Following several days on which the temperature went as high as 70°, the thermometer took a sudden drop and there was a mild blizzard. But there is little chance that even this marked change in the weather will have much effect at this late stage of the season.

Even were the cold snap to last for several weeks, the more conservative dealers have little hopes of much better business, because the market is heavily loaded with coal purchased at bargain prices, and only a continued heavy demand can make much impression upon these stocks. That such a demand will be had seems unlikely, as purchasing will probably be from hand to mouth for the rest of the season. Half-time operations is the rule, while some are forced to suspend entirely, especially those having no contracts; and even these last are receiving stop orders.

The absence of any demand for domestic coal makes it almost impossible to quote prices. There has been no market, the few sales at extremely low prices being too few to establish such quotations as the market. On the other hand, the steam market has shown some signs of strengthening, the necessarily low output of the prepared grades having resulted at last in a short supply of screenings. Eastern Kentucky of the better grades is selling at 75@85c., and growing stronger, while western Kentucky can be had as low as 60c.

## SOUTHERN AND MIDDLE-WESTERN

## BIRMINGHAM

Practically the same conditions prevail on steam and domestic coal. Furnace and foundry coke quiet and blacksmith coal normal. Fairly good tonnage of pig iron booked. Car supply sufficient for demand.

There is little new in the coal market this week, as no change either way has been noticed, either in the volume of business or prices. Domestic coal is quiet, and many companies are curtailing their output, hoping to stimulate the price. Steam coal, while not in quite as stagnant condition as lump, is quiet, some of the large contracts specifying the minimum shipments for the time being.

The output is slightly larger at the present time than the demand, which has a tendency to weaken the market. Sales of blacksmith coal are reported in a satisfactory volume, a slightly larger tonnage being negotiated than last week. A fairly large tonnage of pig iron was booked by the furnaces, with prices about the same. The car supply seems sufficient for the present needs.

## ST. LOUIS

Increased country demand resulted in slightly improved conditions, but market still heavy. Coal selling below cost. Larger shipments to West and Northwest.

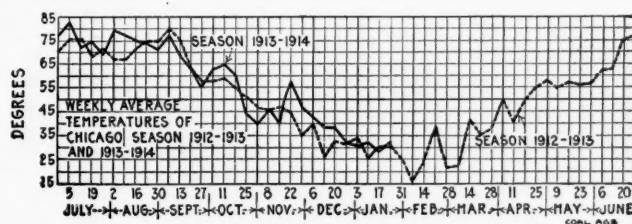
There is a slight improvement in local conditions, but the average observer would scarcely notice it. Generally speaking, however, conditions are about as they have been for several weeks past. There has been some little demand from the North and West for coal moving through the St. Louis gateway, but locally nothing of importance has happened.

The low point has been reached on Carterville coal, when lump and egg sold for about \$1.05 and Franklin County for \$1.20. In the Standard district lump went as low as 80c. and at the same time screenings were bringing 45c.; this coal runs 70% lump and 30% screenings, which means a net price for the mine-run coal of 69½c., and it is absolutely impossible to produce coal for anything like that. Yet there is a large tonnage of it under demurrage at East St. Louis continually. In high-grade coal 2-in. screenings are weak at about 55 to 65c., and the washed sizes have also dropped off.

Anthracite is still coming in and is a drag on the market; the same applies to coke and smokeless. At one time in the month of January there was something like 30 cars of smokeless at East St. Louis, with several dollars demurrage on each car.

The market continues unchanged as follows:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump.	....	....	....	\$0.90@1.00
3-in. lump.	....	....	....	....
6-in. lump.	\$1.25 @ 1.50	\$2.25	1.50	1.15@1.25
Lump and egg.	1.85 @ 2.15	....	....	....
No. 1 nut.	1.15 @ 1.40	....	....	....
Screenings.	0.75 @ 0.80	....	....	....
Mine-run.	1.10 @ 1.20	....	....	....
No. 1 washed nut.	1.60 @ 1.75	2.25	1.60	....
No. 2 washed nut.	1.25 @ 1.35	....	1.25	....
No. 3 washed nut.	1.15	....	....	....
No. 4 washed nut.	1.05	....	....	....
No. 5 washed nut.	0.50	....	....	....



## KANSAS CITY, MO.

More favorable weather has stimulated the demand and mines working good. Market is not steady, as a rule, and outlook is indeterminant and not encouraging.

The weather has been more favorable than at any time during the winter, though even yet it has failed to provide a consecutive stretch of low temperatures. In fact, the winter of 1913-14 will establish a precedent in the way of mild weather in the Southwest unless a marked change is seen in the near future. However, the operators of Kansas and Missouri have been quick to take advantage of the temporary stimulant, and are in most cases working from 70 to 80% capacity. Some others which hold railroad contracts of importance are running full time, although not producing as much coal as could be sold with more favorable weather conditions.

Demand for nut has been unusually strong recently. Lump, on the contrary, is moving slowly, and not at all in proportion to nut. Screenings, contrary to expectations, have been plentiful, the expected shortage failing to appear. The market has been steady. No change is likely in the face of the present weather, the situation not being one that can be helped by price concessions, according to operators.

## OGDEN, UTAH

January was a weak month and market conditions have not improved. With exception of a few localities warm weather is prevailing throughout the territory. Surplus of nut and slack coal at the mines. Colorado mines working.

During January the operators in Wyoming and Utah were compelled to put the mines on a summer basis and large reductions in the force were made, some of the mines being shut down entirely. This condition was caused by a sluggish market, which could not be made active, although a few localities were visited by colder weather. All dealers have been carrying some stock and took advantage of the lower temperature to dispose of the surplus and consequently were receiving no shipments from the mines.

No doubt the market will not improve until all dealers have "cleaned up," at which time shipments will be resumed as the trade demands, which means on a summer basis.

Owing to small demand for lump coal, nut has been a drag on the market and most of the mines are carrying a surplus; slack coal is being unloaded with practically no demand.

Reports from Colorado show that the mines are working sufficiently to take care of the market and are having some idle days on account of the diminished demand.

Quotations remain unchanged:

	California	Nebraska	General
Lump.....	\$3.00@3.50	\$3.00	\$2.75
Nut.....	2.50@3.00	2.00	2.25
Mine-run.....	1.85	1.85	1.85
Slack.....	1.00	1.00	1.00

## PORTLAND, ORE.

Mild weather throughout Northwest cause of light demand for coal for domestic purposes. Conditions in general way unchanged.

The Pacific Northwest is enjoying an unusually mild and open winter and consequently the demand for coal for domestic purposes has been lighter than the average. There has scarcely been any freezing temperatures so far this winter in this district, and as the period for the coldest weather is past, the probability of having any is not very strong at this time. As a result, prices have not fluctuated here this winter, and there is little chance that they will advance. Keen interest is taken here in the passage of the Alaska railroad bill, as it is believed this will mean rapid development there, including coal.

## PRODUCTION AND TRANSPORTATION STATISTICS

## BALTIMORE &amp; OHIO

The following is a comparative statement of the coal and coke movement over this road for December and the years 1912 and 1913:

	December		Year	
	1913	1912	1913	1912
Coal.....	3,005,914	2,648,429	35,097,656	31,788,598
Coke.....	269,998	416,296	4,620,798	4,734,418
Total.....	3,275,912	3,064,725	39,718,454	36,523,016

## COAL MOVEMENT

The following is a summary of the movement of coal and

coke over 13 principal railroads during November and the first eleven months of 1913 in comparison with 1912, in short tons:

	November		Eleven Months	
	1912	1913	1912	1913
<b>Anthracite</b>				
Baltimore & Ohio <sup>1</sup> .....	166,263	171,714	1,433,485	1,398,652
Chesapeake & Ohio <sup>1</sup> .....	1,193	1,225	21,909	15,864
Erie <sup>2</sup> .....	654,577	732,726	6,857,482	8,016,552
Pennsylvania <sup>1</sup> .....	916,914	987,487	9,275,631	9,699,210
Virginia <sup>2</sup> .....	83	50	180	959
Total 5 roads.....	1,739,215	1,893,202	17,588,687	19,131,237
<b>Bituminous</b>				
Baltimore & Ohio <sup>1</sup> .....	2,899,414	3,080,093	31,331,345	33,732,240
Buffalo, Roch. & P. <sup>1</sup> .....	742,292	869,023	7,569,563	8,907,011
Buffalo & Susq. <sup>1</sup> .....	145,075	138,315	1,391,497	1,645,656
Chesapeake & Ohio <sup>1</sup> .....	1,264,490	1,528,761	15,745,385	15,716,868
Erie <sup>2</sup> .....	37,973	20,437	258,043	340,201
Hunt. & Brd T. Mt. <sup>1</sup> .....	114,672	107,016	1,126,409	1,242,310
New York Central.....	814,076	755,397	7,481,979	8,414,117
Norfolk & Western <sup>1</sup> .....	1,896,817	2,026,798	20,945,681	22,056,646
Pennsylvania <sup>1</sup> .....	3,934,876	4,509,375	42,162,485	47,171,538
Pitts. & Lake Erie <sup>1</sup> .....	968,615	\$808,622	10,496,591	11,914,029
Pitts. Shaw. & North <sup>1</sup> .....	196,266	227,820	1,815,537	2,535,163
Virginia <sup>2</sup> .....	316,504	421,971	3,266,604	4,190,394
Western Maryland.....	247,258	218,876	2,569,878	2,678,290
Total 13 roads.....	13,578,328	15,005,504	146,160,997	160,544,461
<b>Coke</b>				
Baltimore & Ohio <sup>1</sup> .....	435,001	343,387	4,367,525	4,011,242
Buffalo, Roch. & P. <sup>1</sup> .....	54,755	27,509	496,975	472,671
Buffalo & Susq. <sup>1</sup> .....	27,534	22,621	255,198	278,124
Chesapeake & Ohio <sup>1</sup> .....	24,216	28,535	237,303	328,456
New York Central.....	7,648	.....	80,585	36,207
Norfolk & Western <sup>1</sup> .....	136,912	117,807	1,334,855	1,413,079
Pennsylvania <sup>1</sup> .....	1,245,500	999,500	12,128,463	13,011,863
Pitts. & Lake Erie <sup>1</sup> .....	559,858	488,674	5,731,593	6,239,226
Pitts. Shaw. & North <sup>1</sup> .....	.....	.....	5,155	9,383
Western Maryland.....	6,800	4,430	64,424	68,545
Total 10 roads.....	2,498,224	2,032,463	24,702,076	25,868,796

## Coal and Coke, 13 Roads

	1912	1913
January.....	16,421,839	18,936,646
February.....	17,787,331	17,546,496
March.....	19,483,025	17,631,345
April.....	13,429,367	16,850,690
May.....	15,635,568	18,986,796
June.....	16,702,153	18,580,363
July.....	16,635,448	18,704,710
August.....	18,396,247	19,718,856
September.....	17,432,358	19,046,247
October.....	18,712,657	20,611,176
November.....	17,815,767	18,931,169
December.....	17,929,632	.....

Total, 12 months..... 206,381,392

<sup>1</sup> Includes coal from connecting lines.

<sup>2</sup> Includes company's coal.

<sup>3</sup> Does not include company's coal hauled free.

Note.—The Southern Railway hauled 362,439 short tons of coal during October, 1913, and 3,495,721 short tons during the 10 months ending Oct.

## FOREIGN MARKETS

## GREAT BRITAIN

Jan. 23.—There is a little more inquiry for admiralty large coals. Collieries who are well placed as regards tonnage, are holding for higher prices, but others in need of vessels, are accepting easier terms. Quotations are approximately as follows:

Best Welsh steam.....	\$4.50	Best Monmouthshires..	\$4.17
Best seconds.....	4.38	Seconds.....	4.05
Seconds.....	4.26	Best Cardiff smalls.....	2.67
Best dry coals.....	4.38	Seconds.....	2.52

## COAL SECURITIES

William J. Hoey reports the market on various coal securities for the week ending Jan. 31, as follows:

Stock	Bid	Asked	Stock	Bid	Asked
American Coal.....	80	100	Jef. & Cle'd. C. & I. Pfd...	70	80
American Coal Products.....	83	84	Kentucky Block Cannel...	40	60
Amer. Coal Prod. Pfd.....	104	106	Lehigh Valley Coal Sales.....	192	200
Big Muddy Coal & Iron.....	75	100	Leh. & Wilkes-Bar. C. Co.	310	360
Burns Bros.....	50	53	Mahoning Coal R. R.....	700	750
Burns Bros. Pfd.....	94	99	Mahoning Investment.....	64	70
By-Products Coke.....	112	120	Maryland Coal of Md.....	3	6
Central Coal & Coke.....	80	86	Maryland Coal of W. Va.....	7	9
Central Coal & Coke Pfd.....	78	86	Maryland Coal of W. Va. (5% Bonds).....	54	62
Chicago Lumber & Coal.....	45	55	Midland Coal.....	80	90
Chicago Wil. & Ver. Coal.....	25	32	N. Y. S. & W. C. Pfd.....	15	30
Colo. Fuel & Iron Pfd.....	130	140	Pocahontas Con. Collieries.....	92	101
Cumberland Corporation.....	10	14	Pocahontas Con. Coll. Pfd.....	98	105
Cumberland Corp. Pfd.....	39	44	Texas & Pacific Coal.....	97	101
Del. Lack. & West. Coal.....	260	270	Unite Coal of Pittsburgh.....	3	10
Elkhorn Fuel.....	4	10	Victoria Coal & Coke Pfd.....	40	80
Elkhorn Fuel Pfd.....	55	70			
Hocking Valley Products.....	1	4			

## DIVIDENDS

Lehigh Coal & Navigation Co.—Regular quarterly dividend of 2%, payable Feb. 28, to holders of record, Jan. 31.